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Challenges to Asian Urbanization in the 21st Century

edited by
Ashok K. Dutt, Allen G. Noble, G. Venugopal and S. Subbiah

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Challenges to Asian Urbanization in the 21st Century

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Preface

The 21st century is the century of Asia in the same way the 20th century was of America. In terms of urbanization challenges Asia in the current century is faced with an enormous surge of urban population and the associated problems of rural –urban migration, overcrowding, proliferation of slums, housing shortage, growing unemployment and underemployment and choice between capital intensive productivity vs. labor intensive employment generation, suffocating pollution caused by both industries and motor vehicle fumes, crumbling urban facilities and education / health care systems and above all mind boggling poverty. While facing these challenges many bright urbanization aspects may also be noted –efficient mass transport systems of Japan, banning of leaded fuels for motor vehicles in Indian mega cities, formation and operation of metro –planning organizations, linking rural/urban development and a general consciousness of urban problems, recognization and efforts to resolve them.

This book pioneers the analysis and research effort on urbanization in Asia in the 21st century in light of new and continued challenges. It is a part of a continuum that emanates from the selected papers at the Sixth Asian Urbanization Conference (AUC) held in Chennai (Madras), India in January 2000.AUC is organized almost every third year. The Asian Urbanization Research Organization (AURA) headquartered at The University of Akron's Department of Geography and Planning plans such conferences. Four professors (including emeritus) of the department (Frank J Costa, Ashok K Dutt, Allen G. Noble and Lawrence J.C. Ma) constitute the Executive Committee of AURA.

The first Asian Urbanization conference was held in Akron, Ohio, USA in 1985;two books edited by the Executive Committee members were published based on selected papers presented at the conference; these books were *Asian Urbanization* in 1988 (Berlin: Borntreaeger) and *Urbanization in Asia* 1989(Honolulu: Hawaii University Press). The second AUC was held in 1991 New Delhi, India; selected papers from this conference were published in 1994 entitled *The Asian City: Processes of Development, Characteristics and Planning* (Dordrecht: Kluwer Academic Publishers); the editors were Ashok K. Dutt, Frank J.Costa, Surinder Aggarwal and Allen G. Noble. The fourth AUC was held in Taipei, Taiwan in 1994; papers presented at the conference were published in 1996 entitled *Fourth Asian Urbanization Conference Proceedings* by the Asian Studies Center, East Lansing: Michigan State University, USA, edited by Lan-Hung Nora Chiang, Jack Williams and Heather L.Bednarek. The fifth AUC was organized in London, England and was held in the School of Oriental and African Studies (SOAS), London University; fifty seven papers presented at the conference were published in 1999; the publisher was Aldershot: Ashgate Publishing Ltd. The two volumes entitled, *Urban Growth and Development in Asia,* were edited by Graham.P. Chapman, Ashok K Dutt and Robert. W.Bradnock.They were also a part of the SOAS Studies series in Development.

In addition to introductory chapters this book is organized in four sections: comparative framework, planning parameters, environmental degradation, and growth characteristics. These sections deal with salient features and challenges of Asian urbanization in the 21st century. This book is the first of its kind to unravel the problems and characteristics of Asian Urbanization in the 21st century and to suggest means to resolve them.

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We also gratefully acknowledge the help of GeoJournal Book Series editor: Dr Max Barlow in reviewing the original manuscript of the book and suggesting improvements.

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CHAPTER 1

CHALLENGES TO ASIAN URBANIZATION IN THE 21ST CENTURY: AN INTRODUCTION

ASHOK K. DUTT AND ALLEN G. NOBLE

Asia is the largest continent of the world, both in land area and population. Almost 50% of the world's people live in Asia. It also has the largest number of urban dwellers. Most urban Asians reside in very low income and poorly serviced areas. Asian urban growth in the 21st Century, both in terms of numbers and rate, will be higher than that of any of the other continents. Moreover, the effects of globalization are being felt in Asia in a very dynamic way because very many locations serve as sources of production of commodities generated by intensive labor, whose workers are so lowly paid as to be economically deprived. In developing Asia, in spite of poverty and deprivation in urban areas, growing affluence and a developing upper middle class provide some of the market for the goods and services produced. This group also represents a growing potential market for the already developed countries of North America, Europe, and Japan. Asia's urban future is of great importance not only for the Asians, but for the world in general. In this context therefore, a review of Asian urbanization and its challenges in the 21st Century is highly significant.

CHALLENGES IN THE INTERNATIONAL FRAMEWORK

World population has grown at its fastest rate in the 20th Century. In the 21st Century, however, growth will be much reduced and that reduction will continue on through the 22nd Century. If we consider the medium-fertility-growth scenario predicted by the United Nations, world population will continue to grow up to 2150. Starting from 1965, there has been a continuous decline in the annual crude birth rate (Figure 1-1). This decline stabilizes to a slow rate after 2050, indicating that the world will reach a point where its carrying capacity for the sustenance of the population is at an optimum. Thus, from 2050 to 2200, the birth rate remains in the 11-13/1000 range. Furthermore, a differential growth rate exists by continents(Figure 2-2). The world population has grown from 2.5 billion in 1950 to 5.68 billion in 1995. Following the medium-fertility scenario, by 2050, it is projected to grow to 9.36 billion and by 2200 it will reach 10.9 billion. Such world wide-growth, however, will not be evenly distributed. Rather, the

developing countries, compared to the developed, will have an increasing share of population.

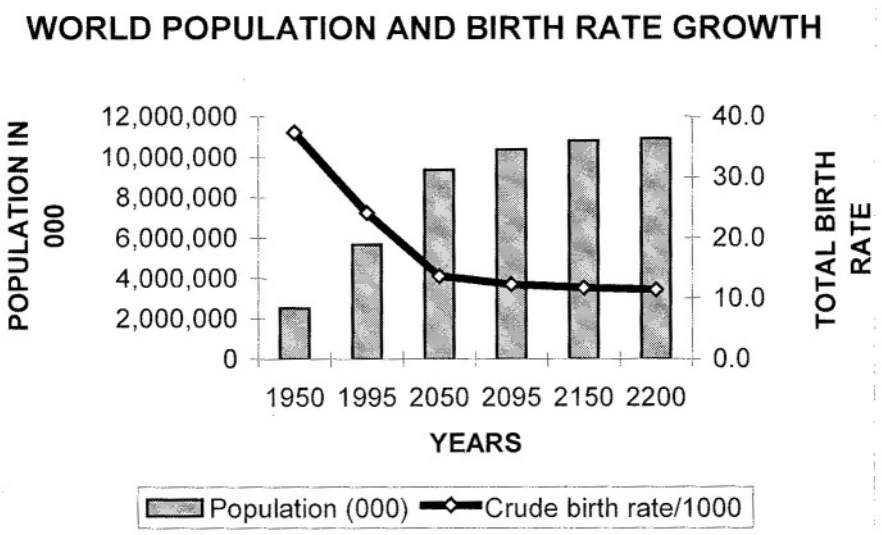


Figure1-1 Growth of World Population and Decline of Birth Rate, 1950 2200 (Data Source: United Nations).

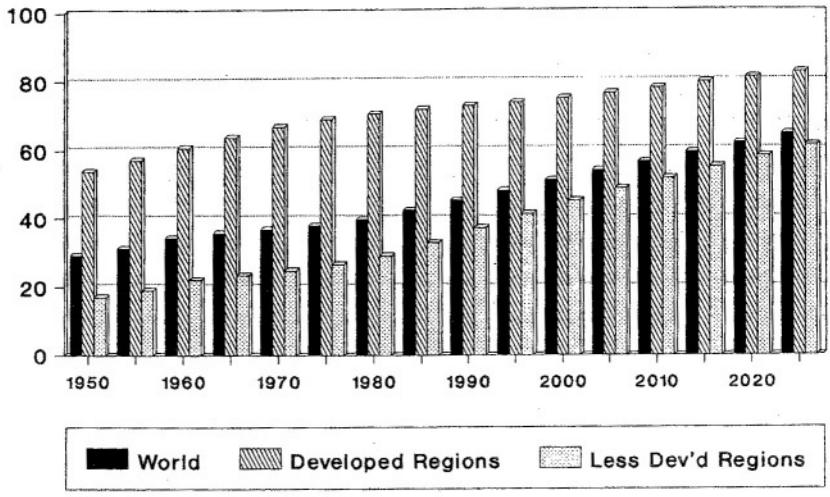


Figure 1-2 Growth of Urban Population by Developed and Developing Countries (Source: Dutt et al 1994. p 2).

Future Growth of Asian Urban Population

Two continents, Asia and Africa, presently largely under-developed, have the largest number of people. In contrast, the developed continents of Europe, North America, and Australia, not only started with a low level of population in 1950, but also will continue to remain at a low level through 2150. The largest population growth will occur in Africa and Asia, causing more urban-related problems emanating in large part from this growth.

The developed countries in 1995 had 18.5% of world population compared to 81.5% for the developing world. However, because of the declining natural growth in the developed countries, their share of world population will drop to 11.4% in 2050 and 9.8 % in 2150. By the same token, because of the relatively higher growth rate, the developing countries' share will rise to 88.6% in 2050 and 90.2% in 2150. All through the 20th Century, China had the largest population of any country. By 2050, however, India will surpass China as the country with the highest population. Asia's population in 1995 was 3.4 billion, but by 2150, it is expected to reach 6 billion, or 60% of world population in that year. This tremendous population growth in Asia will be accompanied by a growing urban population with a declining percentage in the rural areas. Actually, Asia's rural population will start declining from 2010 – 2015. This will mean a continuous migration from rural to urban areas, bringing about greater demands for urban services.

In the year 2000, Asia and Africa were the least urbanized continents; 37.6 % of the Asian population lived in urban areas in the year 2000, whereas it was 37.8% in Africa. It was 74.9% in Europe, 75.4% in Latin America/Caribbean, 77.2% in North America and 85.1 % in Australia/New Zealand.Today, Asia contains 46 percent of world urban population, but it is projected to rise to 54.4% in 2025. The World Bank projections also suggest that by the year 2030, Asian urbanization levels will rise to 55.2%, slightly higher than that of Africa (54.3%). In that year, the urbanization level of the more developed regions of the world will reach 83.7%. Asia will continue to remain much less urbanized compared to other continents, except Africa. This, however, should also be considered in the context of the numbers of urban dwellers. In the year 1996 Asia contained the largest number of people living in urban areas – 1.2 billion. This high figure will persist on into the future because in the year 2010 and 2050, Asia's urban population will increase to 1.8 billion and 2.7 billion, respectively. Such numbers will demand more space for housing, work, transportation, commerce and recreation, increased amenities, improvement in the physical as well as economic infrastructure and will demand greater financial commitments.

Development characteristics, as well as population growth challenges and urban policy and planning solutions, show considerable common affinities in Asia and Africa. Comparative studies contribute to a more precise understanding of many of these considerations. At the same time significant differences are revealed. Newman and Tettey

*Table 1-1 Variables Related To Urbanization: Asian Countries.**

Low income					
Nepal	210	34	11	91	3.6
Bangladesh	350	28	23	67	3.3
Vietnam	350	21	20	71	4.9
India	440	27	28	63	4.7
Laos PDR	320	38	22	77	3.6
Pakistan	470	35	36		3.2
China	750	16	31		6.7
Kyrgyz Republic	380	22	34	35	5.9
Sri Lanka	810	18	23	44	6.3
	453.33	**26.56**	**25.33**	**64**	**4.69**
Middle income					
Uzbekistan	950	23	38	35	4.4
Indonesia	640	23	39	57	4.5
Philippines	1050	28	57	60	3.6
Syrian Republic	1020	29	54		3
Kazakhstan	1340	14	56	28	7.1
Jordan	1150	31	73		2.9
Lebanon	3560	21	89	13	5.7
Turkey	3160	21	73	45	5.5
Malaysia	3670	25	56	34	4
Oman		29	81	52	2.6
Saudi Arabia	6910	34	85	45	2.8
	2345	**25.27**	**63.73**	**41**	**4.19**
High income					
Korea, Rep.	8600	14	80	31	6.3
Israel	16180	22	91	8	9.3
Kuwait		23	97	2	1.9
U A E	17870	17	85	5	2.1
Singapore	30170	13	100	2	6.6
Japan	32350	10	79	9	16
	21034	**16.5**	**88.67**	**9.5**	**7.03**

**Several Asian countries do not have statistics reported.*
Data Source: Uinted Nations.

in Chapter 2 explore the history of African and Asian urban growth and offer some observations relative to the future magnitude of population expansion.

At a more limited scale, Grant and Nijman in Chapter 3 investigate the similarities and differences expressed by two cities, Mumbai in Asia and Accra in Africa, as they confront the challenges of globalization of their respective economies.

Table 1-2 Correlation Matrix of Asian Countries based on 5 Variables from Table 1-1.

		GNP per capita $ (1998)	CBR (per1000) 1998	Urban Pop (% of total) 1998	Male labor(%) 1998	>65
GNP per capita $ (1998)	Pearson Correlation	1.000	-.486	.656	-.680	.626
	Sig. (2-tailed)	.	.006	.000	.000	.000
	N	31	31	31	27	31
CBR(per1000) 1998	Pearson Correlation	-.486	1.000	-.327	.594	-.633
	Sig. (2-tailed)	.006	.	.048	.000	.000
	N	31	37	37	32	37
Urban Pop(% of total) 1998	Pearson Correlation	.656	-.327	1.000	-.808	.173
	Sig. (2-tailed)	.000	.048	.	.000	.306
	N	31	37	37	32	37
Male labor(%) 1998	Pearson Correlation	-.680	.594	-.808	1.000	-.366
	Sig. (2-tailed)	.000	.000	.000	.	.039
	N	27	32	32	32	32
PO_65	Pearson Correlation	.626	-.633	.173	-.366	1.000
	Sig. (2-tailed)	.000	.000	.306	.039	.
	N	31	37	37	32	37

PO refers to Percentage of Population 65 years and above.

Source: Calculated from World Bank Data.

Urbanization and Economic Growth

Every country seeks to make economic strides and most countries succeed in advancement unless impeded by natural catastrophe, war, or abnormal political system change. Afghanistan is a good example of a country where such adverse conditions prevail. Economic development also is very much related to urbanization. As an economy improves, a country becomes more urbanized and the proportion of labor force in agriculture declines. Thus, a system develops where the level of economic development, as reflected in per capita gross national income, determines the level of urbanization.

The World Bank has divided Asian nations into three development categories: (1) Low Income Countries, (2) Middle Income Countries, and (3) High Income Countries. Table 1-1 lists the different countries of these three income groups. It also provides the numbers for five variables by countries, and group means for each variable. The table indicates that (a) with the increase of per capita income, the income levels change (per capita income for low income countries averages $453 compared to $2143 for high income group, (b) the birth rate is lower in the high income countries compared to low income countries, (c) male labor force percentage in agriculture declines as income rises, (d) as life expectancy is high in higher income countries, the percentage of population aged 65 and above increases in high income countries compared to that of the low ones, and (e) urban population has a significant increase from low to high income countries (an average of 25.33 percent urban for the low income and 63.73 percent for the middle income groups and 88.67 percent for high income groups). Also the Pearson's correlation matrix (Table 1-2) points out that urban population is very significantly correlated to GNP per capita and male labor force in agriculture. There is a significant correlation between urban population and crude birth rate. Thus, the correlation matrix substantiates the conclusion that the growth of urban population is positively correlated to the growth of GNP and negatively correlated with crude birth rate and male labor force in agriculture.

Scattergrams (Figures 1-3, 1-4, 1-5) have been constructed for Asian countries showing the relationship of urban population percentage to total population as a dependent variable with three other variables: gross national product per capita, percentage of male labor force in agriculture and crude birth rate per 1000. Figure 1-3 shows that the urban percentage and GNP per capita relationship is hyperbolic, where the high income countries and high urban population percentage are grouped together in the top center and right, whereas low income countries are clustered together at the bottom left. Similarly, Figure 1-4 confirms the correlation matrix findings with the low-income countries clustered together at the bottom center and bottom right. The high-income countries are clustered at the top left. Figure 1-5 shows that the countries with high birth rates are also clustered together with low urbanization at the bottom right of the diagram. They are the low-income countries. High-income countries are at the top left showing lower birth rates and high urban population. The scattergrams present a visual representation of the relationship of urbanization with the three other variables.

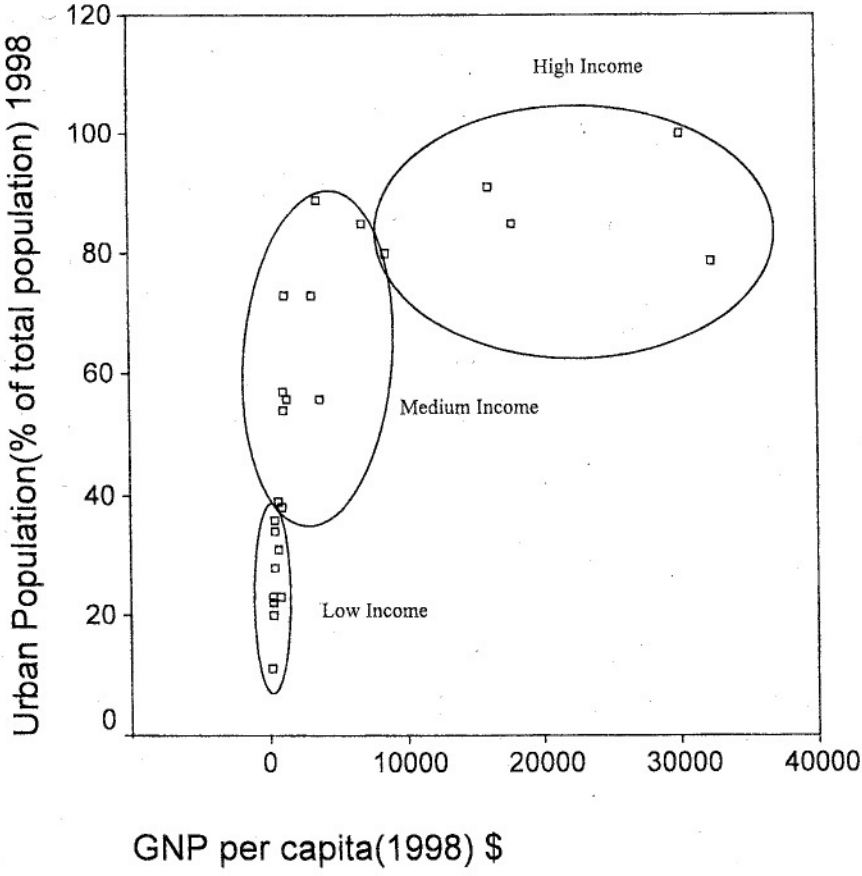


Figure 1-3 Scatter Diagram showing the Relationship between Urban Population and GNP Per Capita of Asian Countries (Data Source:United Nations and World Bank).

URBAN SOCIO ECONOMIC GROWTH

Students of urban development have long been interested in the functions, which urban centers perform, and how changing functions affect the land use and structure of the city. A number of theoretical models have been proposed to explain the function and structure of cities. Often such models offer only partial explanations, however. Noble and Panditharatne in Chapter 4 explore the applicability of various models to Colombo. Western, Indian and Port City models are all useful, but inadequate to explain

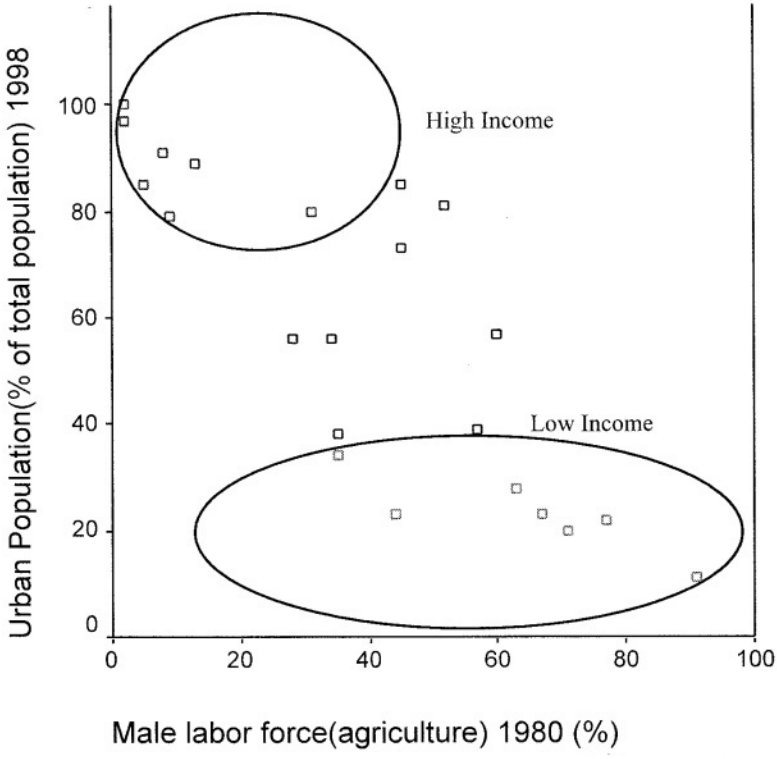


Figure 1-4 Scatter Diagram showing the Relationship between Urban Population and Male Labor Force in Agriculture in Asian Countries (Data Source:United Nations and World Bank).

the entire pattern of Colombo. The authors call for continued work to devise new and more appropriate models which can be applied to the modern city in the developing world.

Beyond models, planners are constantly striving for innovative approaches which will address basic problems in a new way and which in some instances will correct the well-intentioned, but not entirely effective planning strategies of the past. The new Korean planning technique of substituting integrated urban planning, which combines city areas with their surrounding rural areas, neglected the surroundings entirely. As traditional societies make economic advancement, the proportion of urban population grows, creating the potential for the precondition to the take-off-phase of development (Dutt and Noble, 1996). With the advancement to this phase, manufacturing activities- both labor intensive and capital- advance to the extent that

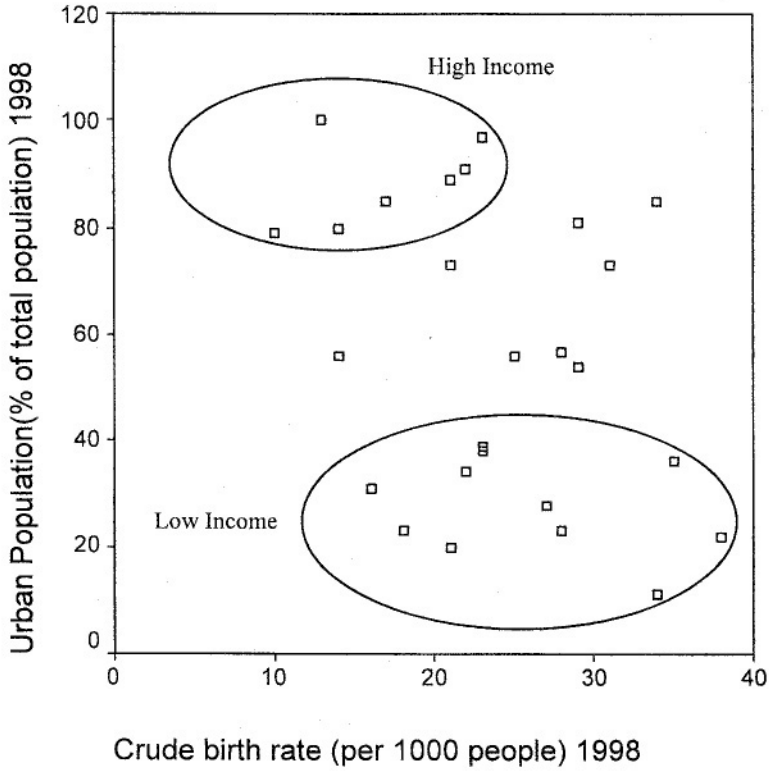


Figure 1-5 Scatter Diagram showing the Relationship between Urban Population and Crude Birth Rate for Asian Countries (Data Source:United Nations and World Bank).

the rural migrants come in large numbers to fill out the labor force. Moreover, population explosion, caused by significantly lower death rates and mild declines in birth rate results in a much increased net growth which then accelerates the "rural push". Thus, a massive increase occurs in rural-urban migration . A scenario develops where increased income not only results in increased urbanization, but also a decline in family size and birth rate along with increasing life expectancy, a greater proportion of people live 65 years and over. Thus, urban growth does not occur on its own, but is engineered by economic forces, which then cause other social forces to interact, creating a chain reaction.

A highly specialized urban place is the Indian Hill Station, a creation of the British. After Independence, many of these urban centers languished with an economy narrowly based on limited tourism and resort activity. William Rense in Chapter 5

evaluates the revitalization of the Indian Hill stations, and by a comparison with American counterparts, suggests the likelihood of considerable future growth and affluence.

A Model of Urbanization

The descriptive model presented in Figure 1-6 points out the causes of urbanization, and its negative and positive consequences. Actions need to be taken to meet the challenges of Asian urbanization in the 21st Century (Figure 1-7). Engines of economic growth are reflected in the acceleration of manufacturing, service and quaternary sectors,

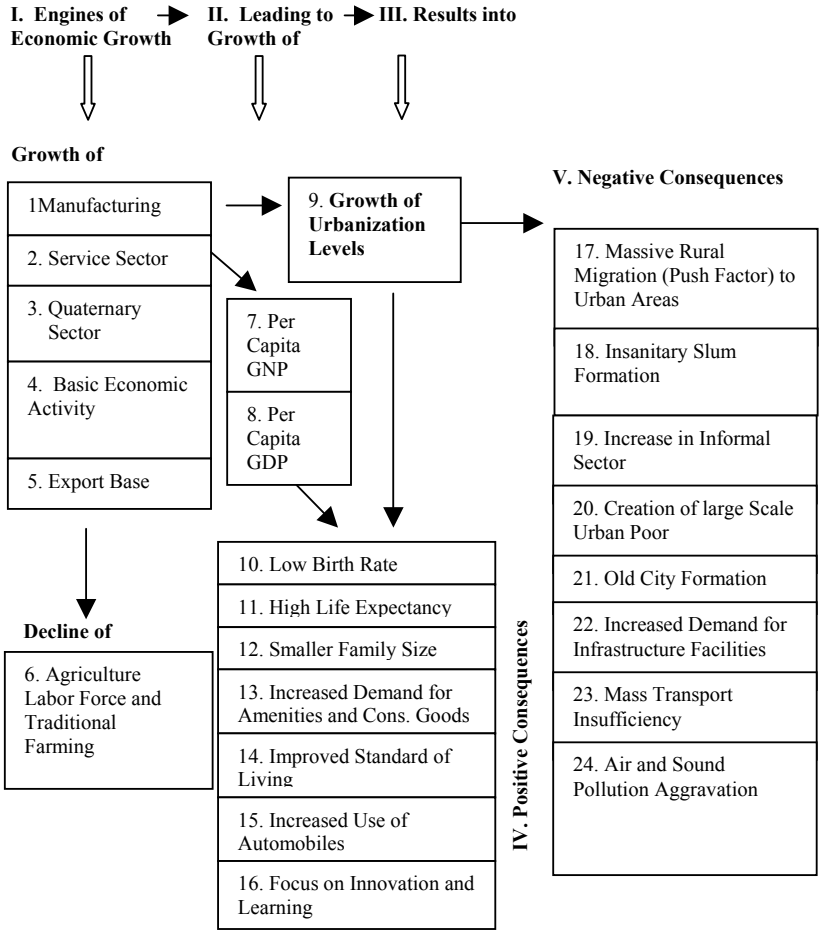


Figure 1-6 Correlates of Urban Growth in Asia: A Descriptive Model (Prepared by Dutt).

along with the development of the basic economic function and rise of export base. Such growth causes the traditional farming practices to be replaced by more advanced scientific and commercial farming. This in turn causes a decline in the proportion of the total labor force needed in agriculture. The actions created by the interplay of factors 1-6 (as shown in Figure 1-6) lead to a rising per capita GNP and GDP, causing a country to step up from low to high development, from low income to high income, from poverty to riches. Thus, urbanization levels start to grow approaching the level of developed countries. In the Asian context this has happened to Japan, the Republic of Korea, Brunei, Taiwan, Singapore, Kuwait, Qatar and United Arab Emirates. The growth of urbanization, as well as the changing economic base of particular cities, is reviewed for India in Chapter 11 by George Pomeroy.

1. Strong Family Planning
2. Creation Of Employment Opportunities In Medium And Small Cities
3. Rural Industrialization And Modernization Of Farming Economy To Counteract Rural Push
4. Planned Accommodation Of New Immigrants In Cities
5. Redevelopment Of Old City Core
6. Air, Water Pollution Remission
7. Application Of Pragmatically Based Strategic And Consensus Building Based On Continuous Planning Approach
8. Global Coordination For Problem Resolution

Figure 1-7 Recommended Steps for Meeting the Challenges of 21st Century Asian Urbanization.

In a fully developed nation, over four-fifths of its population come to live in urban centers. In other words, there then is not only a decline in rural population, but the rural proportion of total population also declines sharply. As the country becomes

richer with the rising per capita GNP and GDP, this change creates not only high levels of urbanization, but also low birth rate, long life expectancy, smaller family size, increased demand for more amenities and consumer goods, improved standards of living, increased use of automobiles. Finally the society turns towards greater innovation, scientific advancement and enhancement of learning. Positive consequences as indicated by 10 - 16 (Figure 1-6) are also the basic characteristics of urbanization, though there are additional characteristics as well. Among other conclusions, Pomeroy notes that the change to a post-colonial economy in India, instead of reversing or countering relationships from the colonial economy often failed to alter existing regional characteristics and inter-regional relationships. The process of urbanization appeared to be independent of political control.

NEGATIVE CONSEQUENCES OF URBANIZATION

Urbanization in Asia also has negative consequences, most of which are common to developing countries elsewhere. For example, massive rural to urban migration generated by the push factor is typical of all developing countries of Asia, though for almost three decades (1950s-1980s), such process was virtually absent in China where rural-urban migration was restricted by not providing urban employment to new migrants and disallowing them food ration cards and housing permits. Massive migration has also fostered the growth of several mega cities in Asia largely because great numbers of migrants are attracted to large cities where they perceive that they have better prospects of finding employment. When low-skilled, poor migrants from rural areas move to urban areas, they become a new kind of proletariat with little to lose. They take up any kind of job and live on the pavements, in temporary shelters and in the poorest housing conditions of slums. Most of them end up being employed in the informal sector. Thus the slum-dwelling, urban poor develop their own culture of deprivation, poverty, lack of education, and insanitary living. They are mostly incapable of rapid upward movement.

The magnitude of the problem can be gauged by Delhi, where roughly a third of the city's entire population is estimated to live in squatter settlements at the lowest income levels (Haider 2000, 31). The same proportions of people are slum dwellers in Kolkata (Calcutta), where they live against the background of dire poverty. This contrasts with the affluence of those nearby with higher incomes.

The old city, both in developed and developing Asia, generates its own problems. Developed countries such as Japan, Republic of Korea, Taiwan and Singapore have been able to redevelop their old cities to give a modern and inviting look. The old core areas of the developing country cities still have large areas that are untouched by new developments. At the same time, the modern impetus of local developers is often to stress competition with other urban centers. The "bigger is better" theme and its consequences are treated in Chapter 14 by Jack Williams. The city of Kaohsiung strives to best Taipei, but at considerable cost to its citizens. Williams offers several more

suitable development themes, which can apply not only in Taiwan, but elsewhere in Asia, and perhaps beyond.

The increasing population and the wide knowledge and awareness of new facilities cause demands for increased and better infrastructure facilities such as water supply, sewerage, garbage collection, electricity supply, paved/wide streets, schools, and mass transport. Growth of population along with its increasing density is supplemented by spatial expansion of the cities; all these conditions force greater demand on mass transport. Taking a look backward, Loren Siebert in Chapter 15 uses modern GIS mapping techniques to evaluate the development of the rail system, which expanded to serve the demands of the growing Tokyo population.

Due to financial constraints, cities rarely can cope with the increased demand for infrastructure and mass transport. The technology of the internal combustion engine developed in the West at the end of the 19th Century has been introduced to Asian countries more massively since the end of the Second World War, resulting in an increased use of private automobiles and buses. Also, in developing countries, a large number of three-wheelers with two cycle engines have been introduced. All these and other vehicles as well as unrestricted industrial expansion cause extensive air and noise pollution that in turn not only causes environmental damage, but also results in heightened health concerns.

The impact of pollution in the growing cities of Asia is such a pervasive problem that several chapters in the book are devoted to its discussion. John Benhart in Chapter 12 reviews the dimensions of the problems in three centers, Singapore and Hong Kong, both major ports, and Tokyo, where measures to combat pollution probably have received the greatest attention of any Asian city.

Air pollution represents the most widely recognized urban pollution problem and one of the most serious. Mahr and Kumar in Chapter 10 investigate the deterioration of air quality in the Indian capital, Delhi. Air quality is, however, only one aspect of environmental pollution, which impacts most seriously on the squatters and dwellers of the crowded slums.

Prolonged exposure to deteriorating environmental conditions affects the health and well being of the urban residents so situated. Using the city of Pondicherry as a case study, Krafft, Kremer, and Schraeder in Chapter 11, investigate environmental degradation as a health risk which ultimately has the potential to affect not only urban population growth, but economic development as well.

Approaching the problem of urban pollution from a quite different direction, Venema, Calamai and Ponnambalam in Chapter 13 suggest that the development of rural biomass energy resources has the potential to reduce rural/urban migration, and hence urban industrial pollution. They note that "prospects for sustainable urban development in India will remain remote until the rural-urban exodus is effectively mitigated by sustainable rural development."

THE SYSTEMIC PARAMETERS OF URBAN PLANNING

The process of urbanization cannot be checked because we all aspire for prosperity. Economic development in its turn results in urbanization. Therefore it is imperative that the negative consequences of urbanization should be combated in the most effective way possible – by integrated planning, research and policy formulations.

Urban planning operates within systems influenced and modified by considerations arising outside the particular urban area. Urban planning must agree with the objectives and operation of national planning policy, for example. In Chapter 7, Khahn and Dutt review the shifts in central planning which have shaped the political and economic environment in which the Viet Nam urban system has emerged.The success and failure of national planning affected urbanization parameters of the country; also resulting in accelerated growths around two metropolitan centers-Ho Chi Minh city and Hanoi.

National policies,with particular reference to foreign entities, may affect local urban planning. This is nowhere more evident than in Israel. Efrat and Noble in Chapter 8 discuss recent developments and responses (before September 11, 2001) which have shaped planning efforts and policies in Jerusalem.

The Failure of Western Planning Procedures

As a number of observers have noted, a tendency exists within the national, regional, and local urban planning agencies of developing countries to adopt planning regulations and practices from developed countries with little or no change on the theory that these countries have already passed "successfully" through problem stages of growing urbanization. Therefore, their methods offer a solution to the extremely difficult situations, always more vexing, that face the planners of developing countries. Two conditions encourage this process. First, and especially in former colonial areas, many of the planners received their training in the metropolitan country, and many early advisors were drawn from the ranks of planners in these areas. Both of these groups are familiar with and feel comfortable with such planning approaches. Second, the pressure of rapid population growth, rapid urban growth, and consequent extreme pressure on local resources, forces many planners to turn to existing solutions, rather than seeking in a more time consuming fashion, alternative policies, which in any event are untried and thus problematic. To mix a metaphor, "The bird in the hand offers the quickest fix."

Unfortunately, the quick fix usually proves to be ineffective over the long period. The major difficulty is that conditions in the developing country do not replicate those of the developed country. The process of uncritical adoption has a long history usually dating back to the colonial period (Evenson 1989, 183).Choguill (1994, 943) offers an interesting situation with respect to physical planning legislation in Bangladesh:

> At first sight, this appears rather complex, as the system is based on a number of legislative acts. The matter clarifies itself somewhat when it is realised that the various acts were imported separately on a piecemeal basis. Hence, the British 1875 Public Health Act became the 1932 Bengal Municipal Act and with independence was upgraded as a basis for

> urban administration. Most of the British 1947 Town and Country Planning Act was imported to become the East Bengal Building Construction Act of 1952, while the remainder appears to have become a part of the Town Improvement Ordinance of 1958. That nation's Town Improvement Act of 1953 was actually imported from India, where it had previously served as the Calcutta Improvement Act of 1911, but the Indians adopted their Act wholesale from Glasgow, where the model used had been known as the Glasgow Improvement Trust of 1866.

The most recent Dhaka Plan (1995 - 2015) based on a imported strategic planning concept has realistically pointed out that priority be given to water-logging and flooding in order to seek solutions to Dhaka's future areal expansion, which is inevitable. The problem of such solution is financial constraints as Bangladesh is too poor to invest in massive hydrological projects for metro development.

A newly emerging planning approach in the West, communicative planning, is investigated by Yu-Hung Hong in Chapter 6 to determine its suitability in developing countries with restricted democratic institutions. Using two case studies, Hong concludes that four fundamental changes need to be made before the technique will succeed.

NEW TRENDS IN GLOBALIZATION

The recent economic globalization trends have restructured the labor-capital relationship between the cities of developed and developing worlds. In the new structure of economic globalization it is not only the less skilled jobs related to garment, shoe, and hand-bag making that are being created in developing countries, such as China, India, Sri Lanka, Thailand, Indonesia, and Bangladesh; but 'outsourcing' in the form of machine, engine, and automotive and other body parts has become widespread. Upscale jobs such as chip design, engineering, basic research, and financial analysis are also parceled by the multinational corporations to developing Asian countries where the labor costs are much cheaper. These semi-skilled and upscale jobs are being created increasingly in the developing country cities. Here are two examples from India:

> In dazzling new technology parks rising on the dusty outskirts of the major cities [of India], no one's talking about job-losses. Inside Infosys Technologies Ltd.'s impeccably landscaped 55-acre campus in Bangalore, 250 engineers develop IT applications for BofA. Elsewhere, Infosys staffers process home loans, for Greenpoint Mortgage of Novato, Calif. Near Bangalore's airport, at the offices of Wipro Ltd., five radiologists interpret 30 CT scans a day for Massachusetts General Hospital. Not far away, 26-year-old engineer Dharin Shah talks excitedly about his $10,000-a-year job designing third-generation mobile-phone chips, as sun pours through a skylight at the Texas Instrument Inc. research center. Five years ago an engineer like Shah would have made a beeline for Silicon Valley. Now he says "the sky is the limit here" (Engardio, Bernstein and Kripalani, 2003, 50 – 51).

> Even Wall Street jobs paying $80,000 and up are getting easier to transfer. Brokerages like Lehman Brothers Inc. and Bear, Steams & Co., for example, are starting to use Indian financial analysts for number-crunching work. "A basic business tenet is that things go to the

areas where there is the best cost of production, says Ann Livemore, head of services at Hewlett-Packard Co, which has 3300 £ software engineers in India. "Now you're going to see the same trends in services that happened in manufacturing (Engardio, Bernstein and Kripalani, 2003, 53).

MEETING THE CHALLENGES OF 21ST CENTURY ASIAN URBANIZATION

Although new solutions and policies, appropriate to local conditions must still be sought, a number of very basic objectives can be identified (Figure 1-7). At least eight considerations must be pursued, as follows:

1. A strong family planning program is necessary both in urban and rural areas. Natural urban population growth can be controlled by reducing the birth rate. If the rural population growth declines, the rural push will diminish and fewer rural migrants will head to urban areas.
2. The cities that already have populations over three or four million are becoming not only congested, but over burdened, leading to the failure of infrastructure facilities, especially mass transport, water supply and sewage. This also results in the formation of slums and the aggravation of negative conditions in existing slums with proliferation of unhygienic conditions. Thus, generation of employment facilities in medium and small size cities will restrict migration to mega cities.
3. Rural development, both in agriculture and industries, will not only improve rural income, but also discourage rural push. The improvement in agriculture requires turning agriculture from traditional approaches to modern and commercial in which the productivity will be much higher. Greater employment will be generated by the introduction of green revolution techniques. The green revolution not only creates a demand for more labor, but also enhances the demand for machines, fertilizers and chemicals that are produced in small, medium and large towns. Rural industrialization, where products can compete in the market fosters rural development that then will discourage surplus rural labor from migrating to cities and increase rural household income.
4. In spite of all efforts, new migrants will come to the cities and the earlier ones will continue to stay on. Therefore, a specific strategic planning program should be devised to accommodate the new migrants and improve the existing slums in order to have hygienic and improved living conditions for the urban poor.
5. Continuous land use change is inherent in the city development. The central core expands with commercial and other activities replacing earlier residences. When this occurs, there should be a mechanism to relocate those who are displaced and have no economic means to settle at a new place. The displaced poor need to be placed in planned redeveloped areas.

6. Redevelopment of the residential areas by applying bulldozing methods should be discouraged unless absolutely necessary. Such bulldozing of neighborhoods causes enormous damage to the social psyche, as well as the inconvenience to the people affected. Such techniques irreparably disrupt an existing neighborhood.
7. Urban and city-regional planning has gone through four basic approaches: a) physical based master planning, b) comprehensive planning, c) strategic planning and d) collaborative action based on consensus building. Though most plans in Asia have adhered to physical based and comprehensive planning, the time has come when they be revised based on strategic planning and collaborative action founded upon consensus. Such action will be more practical and resolve the basic problems with the concurrence of all affected groups.
8. In this age of globalization of the world economy, it is necessary that city-regional planning be formulated to reflect this reality and to collaborate when possible with the globalization agencies (multinationals, World Bank).

CONCLUSION

If the 19th century was the century of Europe and the 20th century that of North America, then it is probable that the 21st century will be the century of Asia. At the same time, it is likely that problems associated with urbanization will be more severe in Asia than elsewhere because of the continuing rapid growth of its cities. The critical nature of Asian urbanization is set in this volume against the context of its historical development. Some of the most difficult problems also are elaborated along with possible solutions. Only time will tell if such remedies will alleviate the bleak prospects of Asian urban growth.

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CHAPTER 2

A HALF-CENTURY OF THE WORLD CITY:ASIAN AND AFRICAN CITIES

KOFI NEWMAN AND CHRISTIAN TETTEY

Although a catalog of problems is encountered when attempts are made to compare cross-national urbanization data (Berry, et al 1993), many geographers, planners, administrators, and development professionals with interest in national and international problems frequently perceive the development of city space as a legitimate area of enquiry. Typically cited in the literature as difficulties in making cross-national comparisons are problems of definition, history, and stages of development and thus of national capacities, problems of resource endowment, and dissimilar "national" attitudes towards economic and social advancement. Typically, these important differences are assumed to influence the extent any state or national system is articulated to the emerging global network of regions, cities, megacities, states, and nations that host today's "post-industrial" and increasingly "footloose" transnational corporations and interconnected subsidiaries. Nevertheless, several inter-city urbanization trends and themes begin to emerge when the size and number of the worlds' cities are compared.

This chapter presents an analysis of changes in the relative rankings of the 30 most populous cities (i.e. metropolitan areas) in the world during the last fifty years (1950-2000) and makes comparisons between Western cities, on the one hand, and Asian and African cities, on the other. It finally discusses the public (administrative and planning) challenges that these cities, particularly those in the developing countries, will probably have to wrestle with under an increasingly global environment. Many European and American cities have, along with their countries, experienced all four stages of the demographic transition. Asian and African cities will continue to be overrepresented in the ranks of the world's most populous cities during the next half century (possibly without regard to successes in industrialization) given four conditions: (1) no dramatic increase in educational levels or the quality of life in rural and peripheral areas; (2) industrial production unable to keep pace with growth in population and remaining centralized in a few major cities; (3) gross national products not increasing dramatically in or across the national space, and (4) major catastrophes such as the progressive diffusion of diseases (Acquired Immune Deficiency —AIDS, or the Ebola virus) not occurring.

In this chapter we do not seek to relate urbanization in Asia and Africa to that of Europe or the United States by "stereotyping urbanization based on the relationship between industrialization and urbanization" (Konadu-Agyemang 2001, 23). We argue for the inclusion of the totality of national experiences and circumstances, from the

influence of colonial history to the activities and motivations of contemporary transnational corporations, as fundamental forces at the bottom of conditions in Asian and African cities/countries. These are important pre-conditions that, in addition to "prevailing urban elites and their values" (Xie, Costa, and Dutt 1996, 35), will continue to determine the form of Asian and African cities.

THE PRESENT GLOBAL SYSTEM OF MAJOR CITIES

At the dawn of the 21st Century, it is almost axiomatic that the current global system, including urban settlement patterns, will continue to be dominated economically, politically, and technologically by Western European, American, and Japanese cities, through the activities of transnational corporations and supporting international intermediaries. According to Sassen (1991) "global" cities such as London, New York, and Tokyo will continue to fulfill important strategic roles in the emerging global system. Still, the vast majority of the populations in Asian and African countries is located in the rural-periphery areas. These populations will continue migrating to a few major cities in response to "push" and "pull" forces, thus significantly influencing the expansion of municipal boundaries, and more important, presenting significant planning and administrative challenges to all governments concerned.

Consequently, an interest in the size (number of people and areal extent) of Asian and African cities seems justified if only for (1) lessons that can be learned from the experiences of these cities, and (2) the application in these cities/countries of lessons learned from other places that have gone through similar transitions in the past. Clearly, from the point of view of Asian and African governments today, the transfer of best urban administrative and management practices for such functional areas as education, transportation, health, communications, and institutional and organizational development, will constitute some of the most crucial policy goals. Such goals have a promise of addressing an increasingly urban population explosion.

GROWTH OF LARGEST WORLD CITIES

Figure1-2 in the previous chapter portrays, decade-by-decade, change in the percentage of the population living in urban areas between 1950 and 2000, with projections for 2000 through 2030. Although the more developed countries of Europe and North America had at the beginning a relatively higher percentage of their population in urban areas, the less developed regions of the world began to show a significant increase in the percentage living in urban areas, particularly after the 1970s. The big picture here is the rapid increase in the rate of urbanization in less developed countries during the last half-century and continuing increase in these urbanization trends through 2030. The increase in urbanization in developing countries suggests they will become

unequal players in a big stakes game where transnational corporations set the rules, the pace, and generally the character of state and local development parameters.

Figures 2-1 and 2-2 present a decade-by-decade summary of changes in the relative ranking of the world's most populous cities, from 1950 to 2010. If the growth in population is a measure of the importance of the world's cities, the last fifty years has been characterized by episodic decline in importance of Western cities among the ranks of the most populous cities in the world. At the dawn of the 2 lst century, the new world city players are a multitude of Asian and African (particularly Asian) cities. Whereas 15 American and European cities were in the ranks of the 30 most populous cities (New York, London, Paris, Essen, and Chicago were ranked 1st, 2nd, 4th, 5th, and 9th, respectively), by 2000 only New York (ranked 5th) and Los Angeles (ranked 8th) were in the top 10 most populous cities in the world. In fact by 2000, 13 of the most populous cities were South Asian and East Asian. In addition two African cities, Cairo (Egypt) and Lagos (Nigeria) were in the group of most populous world cities. Cairo became a member of the group at the beginning of the period in 1950. Lagos, on the other hand, joined around 1990. Thus in 2000, major world city development was the growth in prominence of cities in Japan (Tokyo and Osaka ranked 1st and 18th, respectively), India (Bombay, Calcutta, and Delhi ranked 3rd, 9th, and 14th respectively), and China (Shanghai, Beijing and Tianjin ranked 6th, 12th and 20th respectively) (Dutt, 2001).

ASIAN AND AFRICAN WORLD CITIES

In general, Asian and African representation among the world's most populous cities jumped from 8 in 1950, to 11, 14, and 16 in 1960, 1970, and 1980, respectively. By 2000, the number of countries in this group of top 30 was seventeen. According to United Nations projections (United Nations 1995) by 2010, there will be as many as 20 of these Asian and African cities in the top 30. During the half-decade, a group of Asian cities (Tokyo, Shanghai, Calcutta, and Osaka) consistently ranked among the top 10 most populous cities in the world, although the title of world city belongs to Tokyo (with a 1950 and 1970 population of 6.9 million and 16.2 million, respectively) for being consistently the most populous city during the half-decade. In 2000, Tokyo's population was 28.0 million and is projected to increase to 28.8 million in 2010. Interestingly, Shanghai was ranked the 6th most populous city in the world in 2000 (population 14.2 million), the same rank it had in 1950 when it had a population of 5.3 million. This suggests that stringent Chinese efforts to manage population growth had some success.

Cairo is the only African city that has consistently been among the top 30 most populous cities during the period under review. Cairo's relative ranking has consistently hovered around 16th place. Cairo has grown in population from 2.4 million in 1950 (ranked 25th) to 10.8 million (ranked 17th) in 2000. However, the second African city to join the ranks of the top 30 is Lagos, having achieved that distinction around 1990 at the rank of 21st. The story of Lagos is particularly significant because Lagos'

late arrival in the top 30 most populous cities in 1990 with a population of 7.7 million appears to be the most precipitous introduction of any city, since the 1950s. More important, Lagos moved from the 21st position to the 7th (13.5 million) within a decade. Moreover, according to the United Nations (1995), Lagos will be the 3rd most populous city (with a population of 2l million) in 2010 and will thus overtake Cairo as the largest city in Africa.

The dramatic increase in the population of Lagos does present administrative, planning, social, and economic problems the likes of which have probably not been seen in European and American cities. For other smaller African cities the rate of growth is nearly as dramatic. According to the United Nations (1995) many such cities are increasingly reporting more persons born outside the city, so that rural migration is a prime factor in the rate of population growth: Abidjan (59,000 in 1950 to 2.8 million in 1995); Accra (250,000 in 1950 to 1.0 million in 1984); Addis Ababa (209,000 in 1950 to 1.9 million in 1990); Casablanca (626,000 in 1950 to 2.1 million in 1980); Dakar (223,000 in 1950 to 1.6 million in 1990); Dar es Salem (78,000 in1950 to 1.73 million in 1995); Johannesburg (400,000 in 1931 to 1.8 million in 1995); Nairobi (87,000 in 1950 to 2.1 million in 1995).

GROWTH OF AFRICAN AND ASIAN URBANIZATION

Figure 2-3 compares the rate of growth of the urban population in the major regions of Asia and Africa. African regions, particularly Eastern and Western, compete favorably with Asian regions in terms of growth in urban population (averaging around 3.75% and 4.73% between 1950 and 2000). African cities actually show the slowest decline in rate of growth during the period 1990-2000

Also the Figure 2-1 summarizes what can probably be regarded as the "blueprint" of the emergence of Asian and African countries in the group of the most populous cities in the world since 1950. Again, emphasis must be placed on the prominence of Asian cities to the extent that only two cities in Africa, Cairo and Lagos, have so far reached this level. Particularly noticeable are Indian (Calcutta, Bombay, Delhi) and Chinese (Shanghai, Beijing, Tianjin) cities. In 1950 there were seven Asian and one African city in the ranks of the 30 most populous cities. By 2000, there were seventeen such cities, fifteen Asian and two African. By the end of the first decade of the 2lst century, eighteen Asian and the two African cities will be among the ranks of the most populous cities in the world. Looking forward to 2010, the United Nations projects that three new Asian mega-cities will be ranked among the 30 most populous: (1) Hangzhou, China, (2) Hyderabad, India, (3) Lahore, Pakistan (Dutt, 2001).

The meteoric rise of only one African city, Lagos, into the group of the 30 most populous cities in the world (besides Cairo) raises the question: Why so few African countries South of the Saharan given (1) that Africa is the cradle of humankind and (2) that this region of the world has a long urban history. African cities such as Timbuktu, Meroe, Aksum, and Ife, were in existence as early as the 5th Century B.C. (Gugler 1996,

1950			1970		
Rank	Agglomeration and country	Pop (Mil)	Rank	Agglomeration and country	Pop (Mil)
1	New York, USA	12.3	1	Tokyo, Japan	16.5
2	London, UK	8.7	2	New York, USA,	16.2
3	Tokyo, Japan	6.9	3	Shanghai, China	11.2
4	Paris, France	5.4	4	Osaka, Japan	9.4
5	Moscow, USSR	5.4	5	Mexico City, Mexico	9.1
6	Shanghai, China	5.3	6	London, UK	8.6
7	Essen, Germany	5.3	7	Paris, France	8.5
8	Buenos Aires, Argentina	5.0	8	Buenos Aires, Argentina	8.4
9	Chicago, USA	4.9	9	Los Angeles, USA	8.4
10	Calcutta, India	4.4	10	Beijing, China	8.1
11	Osaka, Japan	4.1	11	Sao Paulo, Brazil	8.1
12	Los Angeles, USA	4.0	12	Moscow, USSR	7.1
13	Beijing, China	3.9	13	Rio de Janeiro, Brazil	7.0
14	Milan, Italy	3.6	14	Calcutta, India,	6.9
15	Berlin, Germany	3.3	15	Chicago, USA	6.7
16	Philadelphia, USA	2.9	16	Essen, Germany	6.6
17	St. Petersburg, USSR	2.9	17	Bombay, India	5.8
18	Bombay, India	2.9	18	Milan, Italy	5.5
19	Mexico City, Mexico	2.9	19	Cairo, Egypt	5.3
20	Rio de Janeiro, Brazil	2.9	20	Seoul, Republic of Korea	5.3
21	Detroit, USA	2.8	21	Tianjin, China	5.2
22	Naples, Italy	2.7	23	St, Petersburg, USSR	4.0
23	Manchester, UK	2.5	22	Philadelphia, USA	4.0
24	Sao Paulo, Brazil	2.4	24	Detroit, USA	4.0
25	Cairo, Egypt	2.4	25	Jakarta, Indonesia	3.9
26	Tianjin, China	2.4	26	Naples, Italy	3.6
27	Birmingham, UK	2.3	27	Metro Manila, Philippines	3.5
28	Frankfurt, Germany	2.3	28	Delhi, India	3.5
29	Boston, USA	2.2	29	Shenyang, China	3.5
30	Hamburg, Germany	2.2	30	Hong Kong, China	3.5

Africa Asia

Figure 2-1 Ranking of Asian and African Cities Among The Top 30 Cities of the World (1950and 1970). (Source: Dutt, 2001, p 16 and United Nations).

1990			2010		
Rank	Agglomeration and country	Pop (Mil)	Rank	Agglomeration and country	Pop (Mil)
1	Tokyo, Japan	25.1	1	Tokyo, Japan	28.8
2	New York, USA	16.1	2	Bombay, India	23.7
3	Mexico City, Mexico	15.1	3	Lagos, Nigeria	21.0
4	Sao Paulo, Brazil	15.1	4	Sao Paulo, Brazil	19.7
5	Shanghai, China	13.3	5	Mexico City, Mexico	18.7
6	Bombay, India	12.2	6	New York, USA	17.2
7	Los Angeles, USA	11.5	7	Karachi, Pakistan	16.7
8	Buenos Aires, Argentina	11.1	8	Dhaka, Bangladesh	16.7
9	Calcutta, India	10.9	9	Shanghai, China	16.6
10	Beijing, China	10.8	10	Calcutta, India	15.6
11	Seoul, Republic of Korea	11.0	11	Delhi, India	15.2
12	Osaka, Japan	10.5	12	Beijing, China	14.3
13	Rio de Janeiro, Brazil	9.7	13	Los Angeles, USA	13.9
14	Paris, France	9.3	14	Metro Manila, Philippines	13.7
15	Moscow, USSR	9.0	15	Buenos Aires, Argentina	13.5
16	Tianjin, China	8.8	16	Cairo, Egypt	13.2
17	Cairo, Egypt	8.6	17	Seoul, Republic of Korea	12.9
18	Delhi, India	8.2	18	Jakarta, Indonesia	12.7
19	Metro Manila, Philippines	8.0	19	Tianjin, China	12.4
20	Karachi, Pakistan	7.9	20	Istanbul, Turkey	11.7
21	Lagos, Nigeria	7.7	21	Rio de Janeiro, Brazil	11.4
22	London, UK	7.7	22	Osaka, Japan	10.6
23	Jakarta, Indonesia	7.7	23	Hangzhou, China	10.3
24	Chicago, USA	6.8	24	Paris, France	9.7
25	Istanbul, Turkey	6.5	25	Hyderabad, India	9.4
26	Teheran, Iran	6.4	26	Moscow, USSR	9.3
27	Essen, Germany	6.4	27	Teheran, Iran	9.2
28	Dhaka, Bangladesh	6.2	28	Bangkok, Thailand	8.8
29	Bangkok, Thailand	5.9	29	Lima, Peru	8.8
30	Lima, Peru	5.8	30	Lahore, Pakistan	8.6

Africa Asia

Figure 2-2 Ranking of Asian and African Cities Among The Top 30 Cities of the World (1990 and 2010). (Source: Dutt, 2001, p 16 and United Nations).

212-213). While recognizing that Asia and Africa are characterized by important historic, physiographic, economic, political, and cultural diversity, partial answers for this question begin to emerge when we compare the two regions in these diverse respects, particularly after the arrival of western European colonizers. In part, the answer has to do with the idea that historically there have been more and larger cities in Asia than anywhere else, "more than the rest of the world put together" (Murphey 1996, 18). The first of these "world cities" in Asia had "piped water supply and drains for nearly every house" and were along the Indus Valley and its tributaries (Harappa in Punjab and Mohenjo Daro on the lower Indus), soon to be followed by other "planned" urban centers in China "a millennium later" (Murphey 1996, 19).

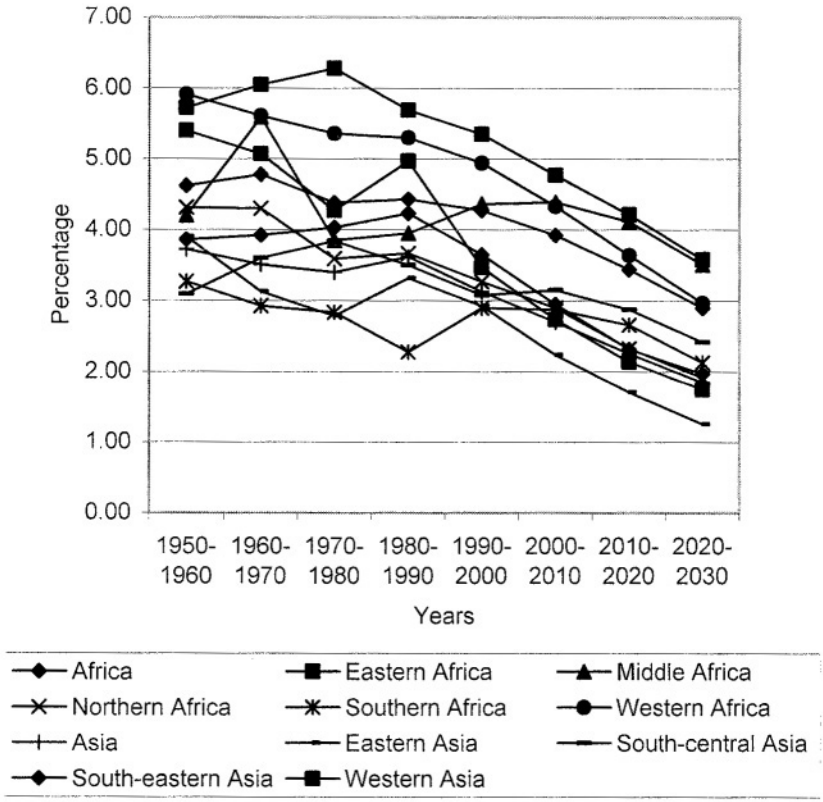


Figure 2-3 Changing Percentage of Urban Population to Total Population for Africa and Asia and by their Regions 1950-60 to 2020-30.

Given the relatively deeper "urban" historical roots on the part of Asian cities, a consideration of physiographic, economic, and political factors begins to allow us to more fully explain the proliferation of Asian cities among the world's most populous cities at present. The last five decades have seen the end of European colonialism in Asia and in Africa. With the emergence of "modern" states in these regions and the evolution of a mass market and global economy has come sharply intensified rural push into urban centers. In Nairobi, Kenya, as in many other African and Asian cities, "when money is borrowed from foreign lands, it goes to build Nairobi and other big towns" (Gugler 1996, 211). Further, compared to Africa South of the Sahara, Asia has so many world cities because the region has relatively better access to river and ocean port resources than the modern states in Africa, over 25% of which are landlocked. With a few exceptions such as the Congo, Nile, Lake Victoria, and Lake Tanganyika, rivers and lakes in Africa tend to be either insignificant in size and length, intermittent, and/or unnavigable. On the other hand, Asian cities such as Karachi, Madras, Rangoon, Calcutta, Bangkok, Singapore, Saigon, Hong Kong, Shanghai, Tsingtao, Canton, Seoul, Yokohama, and Kobe have been significant port cities since the early 1800s. Asian cities offered more dwellers, and migrants to these cities more opportunities for participation in economic activities. More Asian migrants found employment in the production of wheat, hides, oilseeds, spices, rice, salts, and related products. In Asia, other secondary sector activities such as silk, textiles, rubber, and manufacturing in general proved to be more significant than in Africa.

On the other hand, for many African countries, post-independence has meant extreme reliance on primary (mainly mono-agricultural) products and activities, and on other harvested or extracted products that typically must be refined overseas. In Africa South of the Sahara, fewer urban centers were established by the colonial powers. Furthermore, the transportation networks established by colonial powers best served the primary sector economy, thus the commercial and industrial needs of the colonial powers. Later, the period after World War II would usher in the "Cold War" era. During this period the Western European and American geopolitical theory of "containment, "(of Communism) served to demarcate and reinforce the "peripheral inconsequence" of virtually every country in Africa South of the Sahara. Much of Asia was treated as "the rimland," thus of significant geopolitical interest to the "heartland" -Europe and North America. Therefore, after independence the peripheral status of African cities and their countries served to curtail (and in many cases to repel) foreign direct investment in these African countries. It is difficult to ignore the thesis that the racial composition of African countries is not a factor in the absence of foreign direct investment. This is particularly perplexing given that even today Africa has significant untapped economic resources and very modern and vibrant national capitals and regional cores.

Notwithstanding these significant disadvantages, 10 African cities had a combined population of nearly 41.5 million in 2000, which is about 34% of the total population of the 30 most populous cities in the world in 1950, whence this review begins. While the growth of these 10 largest African cities is projected to be around 74%, the

populations of Addis Ababa, Luanda, and Kinshasa are projected to increase by 111.1%, 86.45%, and 86.07%, respectively. The increase in urban population in these three African cities is actually greater than the increase projected for Lagos during the same period (82.68%). This underscores the next group of African world cities poised to join the ranks of the world's most populous cities at the dawn of the 21st century.

WHAT OF THE FUTURE?

We have shown in Figure 2-3 that the rate of growth of major Asian and African regions seemed to have begun to bottom out during the 1990s. As a group, the rate of decline in population was projected to continue declining. Even if these projections hold true, middle Africa, western Africa, and eastern Africa may experience the slowest decline in the rate of growth, at least up to 2030. The intent here has been to present some evidence of the conditions and of the unique problems and opportunities that cities in Asia, Africa, and many other developing areas may face in an increasingly global, interdependent, and converging international economic, political, social, and cultural order.

What thus emerges with this review of world city size and in particular of Asian and African cities since 1950 is the likelihood that these countries will host some of the largest cities in the world during the next 25 years even as western European and American cities continue experiencing "counterurbanization" in the form of urban sprawl producing a reduction in urban population densities. The increasing prominence of Asian and African cities as "new" and emerging mega-cities in the 21st century is almost assured. However, what is questionable is the extent individual countries will succeed in providing education, housing, employment, training, and other urban necessities for the multitude of urban population most of whom are uneducated, illiterate, and more important, unskilled.

"Metropolitan planning, particularly in the poorest countries of Africa and Asia, can achieve very little until the newly independent nations overcome economic dependency and underdevelopment, and establish a framework of national planning within which metropolitan areas and their neighborhoods may plan. It is hard to imagine how the potential of urban planning can be fully realized, however, without a new international economic order…" (Angotti 1993, 240-241).

It seems certain that international agencies, regional blocks of cooperative associations, and non-profit, non-governmental organizations will continue to play a major role in the development of Asian and African countries in the foreseeable future. This is so because most Asian and African countries, (particularly African countries) do not now have the capacity (economic, technical, political, cultural, and social) to shape and control their own destinies. So far, virtually none of these countries has demonstrated the desire to do away with its primarily European superimposed boundaries to consolidate territories into major regional blocks. Such blocks could (1) increase the market and economic base of the individual countries to benefit from economies of scale, (2)

increase their political, social, and cultural status and influence as regional associations, and (3) provide wider market areas for the distribution of goods and services possible through increased specialization within the region and better transportation and communications networks. Notwithstanding, transnational corporations will continue to command ever-larger amounts of the world's resources, thus controlling development opportunities.

CONCLUSION

In this chapter we have argued one must necessarily focus on Asian and African nations and their cities in explaining the development and emergence of the world's most populous cities. To the extent that "Asian (and African) cities represent different settings culturally, physiographically, and economically from those of the Western world" it is problematic and intellectually unfulfilling to "postulate a generalized Asian (or African) city growth pattern and set of characteristics" without recourse to a "global view" (Dutt and Noble 1996, 1). A global perspective shows that an important aspect during the last half-decade is the continuing and rather sharp increase in the size of population of the world's cities. Whereas the combined population of the top 30 cities in 1950 was about 121.1 million, by 2000, the total population of the same number of cities was 359 million, nearly a 300% increase. Indeed, whereas in 1950 the 10 most populous world cities had a combined population of 63.6 million, by 2000, the combined population of only the three largest (Tokyo, Mexico City, and Bombay) surpassed 64 million.

The continued prominence of global transnational corporations, regional blocs, and international organizations with cross-border functions (economic, political, cultural, transportation, communications) in the developing world will continue to underscore the importance of Asian and African "world" cities, relative to the status of their states/nations of origin. This is not to argue that the almost meteoric emergence of such cities will suddenly (or even in time) allow them to assume the prominence and influence of "global cities" such as New York, London, Tokyo, and Hong Kong. If the current geopolitical system is any indication, dependency theory (Bodenheimer 1973, Wallerstein 1974, Hettne 1982) allows us to argue that dependency relationship and not inter-dependency between "peripheral" African and Asian countries on the one hand, and "central" and "metropolis" countries on the other, will continue to limit the development possibilities of many African and Asian countries. Consider that at the dawn of the 21st century, "Of the world's 100 largest economies, 51 are corporations, not countries" (Getis, et al 2000, 375).

The ability of Asian and African countries and their dependent metropolises to make significant gains in nationhood, and more important, to successfully make major improvements in the quality of life of their people clearly is at issue at the dawn of the 21st century. In a developing global economic, political, and social order managed and controlled by an interlocking directorate of former colonial powers and private

transnational corporations, there is reason for concern. Many of these transnational corporations have annual revenues and assets that dwarf the annual budgets and even the gross domestic products of numerous African and Asian countries. The issue then becomes if, how, and whether, the technologies and capacities of these post-Fordist and post-industrial former colonial powers and private corporations will be used in part to benefit the populations in the new emerging markets in these developing countries after transfer of profits from these countries without inhibiting their innovative and competitive positions. These are some of the major issues, problems, and opportunities that many geographers, planners, and administrators will have wrestle with in the 2lst century, and beyond.

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CHAPTER 3

POST-COLONIAL CITIES IN THE GLOBAL ERA:A COMPARATIVE STUDY OF MUMBAI AND ACCRA

RICHARD GRANT AND JAN NIJMAN

One of the ironies of the academic debate on globalization is its Western bias. Much of the theorizing and empirical research is based on the experiences of the United States, West Europe, and other areas in the core of the world economy. This is also true for most scholarly work on cities and globalization, in geography and other social sciences.Overall, the globalization debate is not nearly as 'global' as it probably should be.

In this chapter, we explore the changing urban geographies of post-colonial cities in the context of economic globalization. We argue that cities are best understood in terms of their roles in the wider political economy. Cities differ in terms of the degree and mechanisms in which they are linked to the external economy. This differentiation is as much a function of the idiosyncratic features of the city as a place and location, as it is of developments in the global economy. We conceptualize the broader context in terms of a *political* economy because national policies determine to a large degree the exposure of the urban arena to global economic forces.

Our investigation concentrates on two cities: Accra in Ghana and Mumbai in India. We selected these cities because of their similar political-economic histories and their geographic disposition as gateway cities. Accra and Mumbai are located in former British colonies and functioned as gateway cities during colonial times. After independence, India and Ghana pursued comparable 'nationalist' economic policies for several decades, which limited exposure to the global economy. In both countries this policy was reversed in the mid-1980s, when the Indian and Ghanaian governments initiated liberalization programs. Since then, both cities have once again taken on a gateway function in the global economy.

The analysis concentrates on the changing foreign corporate presence in the two cities and the effects on the cities' overall corporate geographies. We conducted extensive fieldwork in Accra and Mumbai between 1998-2000, and assembled data sets on foreign and domestic corporations, their year of establishment, main activity, address, and size. This chapter reports on our research findings. We argue that there have been profound changes in recent times that were neither random nor accidental. We explain the main trends in Accra and Mumbai in terms of the changing linkages to the world economy since the implementation of liberalization policies.

The rest of the chapter consists of six parts. First, we briefly review the existing literature on post-colonial cities and globalization. Second, we present the main tenets

of our historical theoretical framework. Third, we describe our data and methodology. Fourth, in accordance with our historical approach we provide a brief overview of Accra and Mumbai during colonial times and since independence. Fifth, we concentrate on highlighting the key urban changes since liberalization. We conclude by proposing a model for the global era that may have relevance for cities throughout the lesser-developed world.

THE LITERATURE ON POST-COLONIAL CITIES

The relevant literature can be divided in three parts: first, a recent theoretical literature on cities and globalization; second, a more established, empirically-oriented, tradition of studies of "Third World cities;" and, finally, a specialized literature on urban spatial modeling. All of these approaches have developed in relative isolation from each other and their findings are not integrated. None of the three approaches have thus far been capable of explaining the spatial imprint of globalization in post-colonial cities.

The most coherent body of theoretical work that focuses on cities in a global context is known as the "world city" literature (e.g., Friedmann 1986; Sassen 1994; Knox and Taylor 1995). In as far as this literature focuses on internal urban change, it is usually as a function of world city roles. In the process, cities in the lower strata of the global hierarchy –among them post-colonial cities— have been neglected. The "dirty little secret" of world city research, it has been argued, is its lack of empirical research (Short et al 1996). But that is not the only problem. The world city literature advances claims of universal validity without proper theoretical consideration or empirical research on non-Western cities and particularly post-colonial cities (Nijman 2000a).

Situated at the other end of the spectrum, the literature on Third World cities has a strong empirical orientation, but lacks a theoretical framework that links urban change to global processes. The origins of this literature date back to the 1950s and its earlier works pre-date the globalization debate. At the time, cities and urbanization were regarded mainly in the context of development and underdevelopment. The strength of this approach, especially where case studies are concerned, is in its rich description by scholars with considerable experience in the field (e.g., De Blij 1968; Harris 1978; Murphy 1996; Chapman, Dutt and Bradnock 1999).

Situated between these extremes is a tradition of urban spatial modeling. There is a distinct body of literature about Third World cities that features spatial models, and that is recognized widely among geographers and other students of the urban scene (e.g., McGee (1967) on Southeast Asia; Dutt (1993) on South Asia; and O'Connor (1983) on Africa).

For Third World cities, the best-known spatial model is the one that relates to the colonial era. This model stands out in terms of its clear boundaries, separated land uses, and punctuated landscape. However, the colonial model has not been satisfactorily re-

placed with a post-colonial model. Part of the explanation is that, during the subsequent national phase, the development trajectories of cities in what had then become the "Third World," started to diverge to reflect different development philosophies and the imprint of idiosyncratic national planning strategies and urban cultures. Moreover, the national phase witnessed a blurring of the boundaries and different land uses that were forcefully imposed during colonial times –e.g., European Town versus Native Town (Dutt 1993; Dutt et al 1994). The combined result was that it became harder to design a clear-cut and general model of Third World cities in the post-colonial era.

The main reason for this hiatus is the lack of macro-theory underlying these spatial models. Our distinction between pre-colonial, colonial, national, and global phases is based on the nature of the organization of the global political economy. It is a distinction that highlights a city's external connections to the world-economy as key to its internal development (Chakravorty 2000).

In sum, there is a notable gap in the existing literature between theory on global cities and empirical studies of post-colonial cities. What is needed is a return to the intensive fieldwork and primary data collection in post-colonial cities that was common in the 1960s and 1970s. This time, however, the empirical research should be properly informed by theory on the changing global political economy.

POST-COLONIAL CITIES IN THE WORLD ECONOMY: FOUR PHASES

Our theoretical framework links changes in the urban landscape of post-colonial cities to changes in the global political economy. In other words, we link processes at the urban and global scales. Our conceptual framework may be summarized with the following series of propositions:

A. With regard to the role of the city in the global political economy:

1. The historically evolving structures of the world's political economy imply a variety of changing roles of different cities;
2. In terms of the nature of the city's integration in the world's political economy, current post-colonial cities are different at once from present-day'world cities and from yesterday's 'third world cities'.
3. Post-colonial cities with a gateway function —typically, large port cities— are particularly exposed to the global political economy;
4. Post-colonial gateway cities have moved through four historical phases: the pre-colonial, the colonial, the national, and the global phase.These phases re flect fundamental changes in the nature and extent of the global political economy.

B. With regard to ramifications of these global involvements for the city's eco nomic geography:

1. The internal spatial organization of the post-colonial gateway city is in part a reflection of the city's role in the global political economy.
2. The pre-colonial phase and the national phase are characterized by relative insulation from the world-economy. At these times, urban form was largely determined by local and national contexts.
3. In contrast, the colonial phase and the global phase are characterized by a relatively high degree of connectivity to the world-economy, with a powerful imprint on the urban landscape.
4. The main difference between the global phase and the colonial phase, for our purpose, lies in the political context of the linkages to the global economy.
5. During colonial times, the city's economic linkages were by and large dictated by the colonial power, and economic relations were heavily oriented to the 'mother country.' In addition, colonial governments exercised tight control over urban planning and land-use in the city.
6. During the global phase, the city's economic linkages are directly related to liberalization policies by national governments. The global connections are more intense and more diverse than in any previous phase. Moreover, urban form and land uses are less stringently regulated and they are to a significant degree influenced by market forces.

On the basis of this conceptual framework,and in view of the exploratory nature of this investigation, our empirical analysis of the changing economic geographies of Accra and Mumbai is driven by three questions:

a. To what extent has the presence of foreign corporate activity increased, across various economic sectors, since the implementation of liberalization policies?
b. What has been the effect of the growing foreign presence on the cities' eco nomic geographies in terms of functional specialization and concentration?
c. Are there significant differences between foreign and domestic companies in terms of their activities and corporate locational behaviors? In other words, is there a significant foreign presence discernable in the urban landscape?

IDENTIFYING AND MEASURING CORPORATE ACTIVITY

Our data collection on foreign corporations consisted of three steps, implemented between 1998-2000. First, we identified and mined all available listings of foreign companies and their addresses from local sources. Second, we combined these listings while checking for overlaps and inconsistencies, resulting in a single 'master-list' of foreign companies with addresses for each city. Finally, we conducted a survey among all these companies using the "total design method" (Dillman 1978).

The resulting master-lists for Accra and Mumbai contained, respectively, 655 and 611 companies. For comparison's sake: prior to our research the most comprehensive

listings in Mumbai and Accra counted, respectively, 114 companies (Prowess Data Base, CMIE, 1998) and 65 companies (FIT, 1998).

Existing data –extensive and relatively reliable— on *domestic* companies are easier to obtain in both cities. As a result it was not necessary to survey domestic companies. Domestic company listings used in the empirical analysis were obtained from the Center for Monitoring Indian Economy (CMIE) and from the Ghana National Chamber of Commerce, respectively.

Defining a foreign, or multinational, company is no easy task. Considerable controversy exists in the literature regarding the definition and measurement of "foreign control" (e.g., Banerjee Guha 1997). In addition, most listings did not include a precise definition of the foreign company. Thus, included companies have variable foreign shareholdings, they may be subsidiaries (fully foreign-owned), liaison-offices with representative roles only, or they may be joint ventures that involve two or more companies (foreign and domestic) where the extent of foreign control is not specified. In short, our master-lists are rather eclectic in terms of the type of foreign companies that are included.

One other feature of the data set is worth mentioning. In the survey we targeted the headquarters of each company. The location of a company may not be confined to the address of the headquarters. Many of the larger companies have their headquarters and managerial staff in a prime business area, while back office work and factories will be located elsewhere in the city or beyond. Our mapping of the economic geographies of Accra and Mumbai is confined to company headquarters and should, therefore, be understood as geography of corporate command and control. To allow comparison, the secondary data sets on domestic companies also deal exclusively with company headquarters.

A second survey was conducted in the summer of 2000 to test hypotheses about the degrees of connectivity of different business districts to the global economy. The survey asked respondents to indicate the relative importance of global connections of their company (international phone calls, postal mail, electronic mail, international business trips). We surveyed a random sample of approximately 300 domestic companies in each city. This survey was confined to domestic companies to check the importance of location as a predictor of global connections, while holding constant for foreign or domestic ownership. Before we turn to the data analysis, we provide a brief sketch of the geographies of Accra and Bombay during the colonial and national phases.

ACCRA AND BOMBAY IN HISTORICAL PERSPECTIVE

Schematic representations of the spatial organizations of Accra and Bombay during the colonial period reveal a number of similarities (Figure 3-1 A and B). First, both colonial cities were spatially organized around the ports. The cities functioned as central nodes in the trade networks between their hinterlands and England. They were

strategically located to link rail-lines and shipping routes. The docks, warehouses, and railway terminals, all highlight these functions of trade, storage, and distribution.

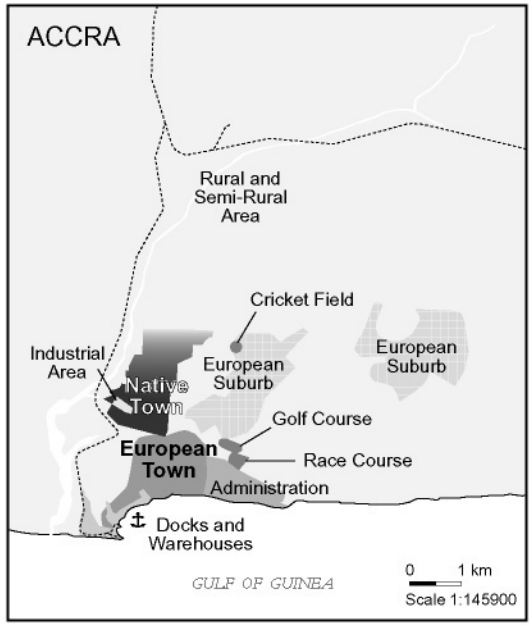


Figure 3-1 A A Schematic Representation of the Economic Geography of Accra during the Colonial Phase.

Second, adjacent to the port area was a well-defined European central business district (CBD) that functioned as the designated location for foreign companies. Most economic activities in the European commercial area involved trade, distribution, transport, banking, and insurance. Zoning and building codes were strictly enforced to maintain an orderly European character and atmosphere in the district (Dossal 1991; Brand 1972).

Third, traditional markets or bazaars were located in a business district in the native town, sometimes referred to as 'colored town.' This area comprised a mix of commercial and residential land-uses. Much commercial activity involved trade of agricultural produce and crafts, small-scale industry, and retailing (Acquah 1957; Mukhopadhyay 1995).

Importantly, the European town and the Native Town were physically separated with designed barriers. In the case of Bombay, this barrier took the form of the Esplanade, a green area that served recreational purposes and that was already designed by the Portuguese in the 16th century. In Accra an open green area served as a formal barrier that clearly delineated the European and Native Towns.

In sum, these colonial landscapes exhibited high levels of segregation of foreign and native commercial and residential activities. The economic geographies of both cities also displayed high levels of functional specialization and concentration. These patterns were not always stable throughout the colonial period and slowly eroded in the latter part of the 19th century. As participation in the international economy increased in the early 20th century and population pressure built up, the boundaries between the different areas gradually blurred.

More drastic transformations proceeded in the wake of independence (for Ghana in 1957 and for India in 1947). Apart from rapid overall population growth in Accra and Bombay that resulted in significant geographical expansion, we should note four changes in the cities spatial configurations. First, the foreign corporate and residential presence declined in relative terms. The elimination of legislation that discouraged native enterprises led to rapid growth of domestic companies that were free to locate around the city.

Second, the former European CBD was at once de-Europeanized and nationalized, politically and economically (Kosambi 1986; Benneh et al 1993). Administrative and military functions in the area were taken over by the national government. New large domestic companies favored a location in this area, leading to a steadily growing corporate density and a large majority of domestically controlled companies. In addition, the area was nationalized in a symbolic sense with the location of the newly established central banks and state-controlled companies.

Third, the former native CBD became increasingly characterized by small-scale businesses, as larger companies moved to the emerging national CBD (the former European CBD). As a result of massive rural-urban migration in the post-independence years, the density and congestion in this area kept increasing. Further, in the absence of the kinds of strict zoning policies from the colonial era and as a result of the spillover of excessive growth in the former native town, the boundary with the former European CBD became increasingly blurred.

Finally, the end of colonial segregationist policies, in combination with the rise of a national entrepreneurial middle class, meant that previously demarcated foreign spaces became diluted. In sum, by the early 1980s, on the eve of major economic reforms in Ghana and India, the economic geographies of Accra and Bombay showed only a modest foreign presence. Compared to the colonial period, the spatial patterns were less punctuated and more diffuse, and boundaries between different areas had become increasingly blurred. This, then, was the situation in Accra and Bombay when liberalization policies opened the gates to the forces of globalization.

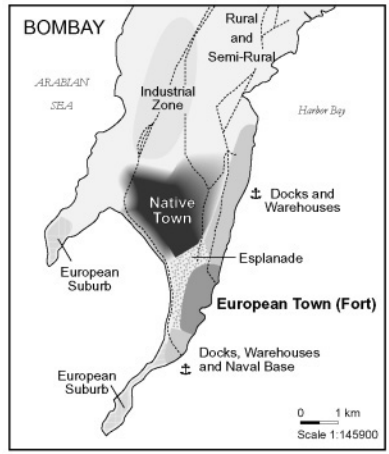


Figure 3-1 B A Schematic Representation of the Economic Geography of Bombay during the Colonial Phase.

ACCRA AND MUMBAI IN THE GLOBAL ERA

In Accra and Mumbai, the single most important increase in foreign corporate activity in the 20th century occurred directly in relation to liberalization policies that were initiated in the 1980s. It was with the onset of liberalization in the mid-eighties (1983 in Ghana; 1985 in India), that the arrival of new foreign companies started to accelerate to unprecedented levels.

Liberalization and deregulation encompassed a range of measures and new types of legislation, the most important of which –for our purpose—related to foreign corporate ownership. In India, such laws have been relaxed several times since 1985, the reforms of 1991 being the most significant. Presently, foreign equity shares of 51% are allowed on a routine basis in most economic sectors and larger shares, up to 100% in a range of industries, are granted by an increasingly lenient Indian government. In Ghana, 100% foreign equity is permitted in all sectors. The eventual liberalization of the mining and the financial sector and the development of global standards in many producer services (e.g., global accounting) have facilitated a large share of the recent influx of foreign companies (Grant 2000).

The reforms have had considerable consequences. In Mumbai, more than half of all foreign companies that are currently active were established after 1985; more than a third entered the city after 1991. In Accra, over 80% of all foreign companies currently active were established since the initiation of reforms in 1983.

New foreign companies in both cities are increasingly concentrated in finance and producer services. Finance companies comprise banks and investment brokers, while producer services include businesses in consulting, real estate, insurance, accounting, advertising, and courier services. Of all foreign companies established in

Mumbai after 1985, 32% are in finance or producer services, as compared to 23% of all domestic companies established after 1985. In Accra, of all foreign companies established since 1983, 16% are in finance or producer services as compared to 9% of all domestic companies established since 1983. It is clear that trends of economic restructuring in both cities entail a decline in the primary and secondary sectors and growth of the services sector with an emphasis on producer services and finance.

A brief sketch of the economic geographies of Accra and Mumbai

Our analysis focuses on Greater Accra and Greater Mumbai. Greater Accra comprises the area bound by the Gulf of Guinea to the south, Achimota Forest in the north, Tema port in the east and Korle Lagoon in the west (Figure 3-2). The area's dimensions are about fifty kilometers east to west and about 10 kilometers north to south. The current population of Greater Accra is around 2.6 million. The average population density in built-up areas is 7,000 people per square kilometer and the highest densities are found in Jamestown and Ussher Town where densities rise to 25,000 per square kilometer.

The Greater Accra area is the largest most industrialized and productive region of Ghana. Greater Accra consists of the 'city' of Accra, the suburbs that have gradually expanded north and east along the major motorways as well as Tema and Ga districts. The highways and the Ring Road in Accra are the key elements of its economic geography and motor transportation (taxis, busses and "tro-tros" or bush taxis) is the only way to commute within the city.

The Port of Tema was developed since 1962 when Accra harbor was abandoned in favor of Tema's deeper and more sheltered harbor. Since then an industrial area, warehouse and storage facilities, and extensive housing for workers have been developed. The area of the present 'city' incorporates colonial Accra, the suburban development beyond the Ring Road and Tema. It contains the port of Tema, the railway terminus, national government functions coordinated from the Castle, and the region's main business districts and the largest indigenous market in the country in the heart of Central Accra. The city also contains a number of slums notably Jamestown, Korle Gonno and Nima.

Greater Mumbai comprises the peninsula bound by the Arabian Sea to the west, Thane Creek to the east, and Vasai Creek and Ulhas River to the north (Figure 3-3). It is connected to the mainland to the north and northwest. The area's dimensions are about fifty kilometers from north to south and an average of ten kilometers from west to east,which corresponds with that of colonial Bombay in past times, but it includes some additional land in the southwest that was reclaimed from the sea in the 1950s. It contains the port, the railway terminals, governmental functions, and the region's main business districts.

Mapping foreign and domestic corporate activities

The general geography of foreign and domestic corporate activities, in Accra and Mumbai, is illustrated in Figures 3-2 and 3-3. Our study uses planning areas (Accra)

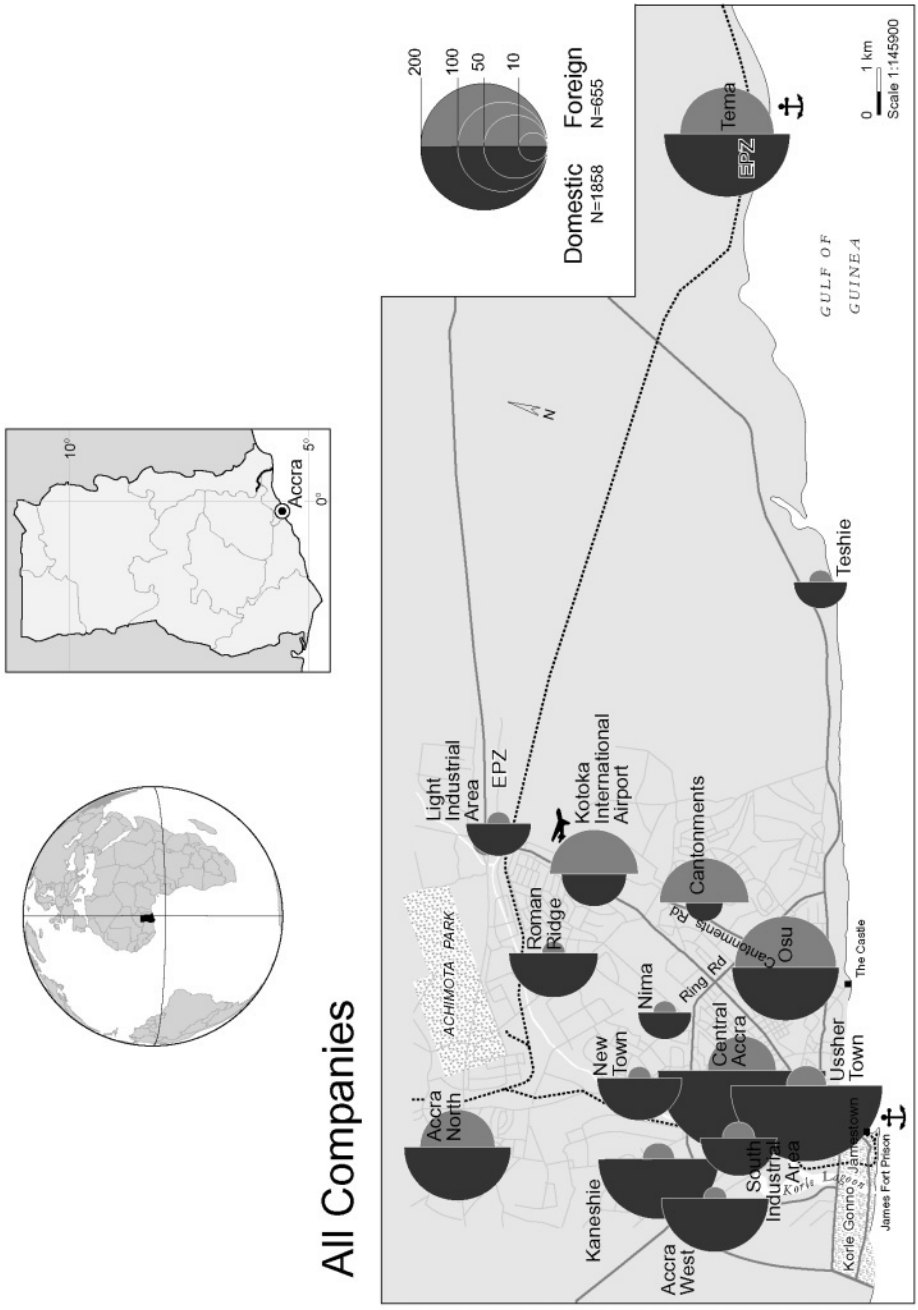


Figure 3-2 An Overview of Accra's Economic Geography in 2000.

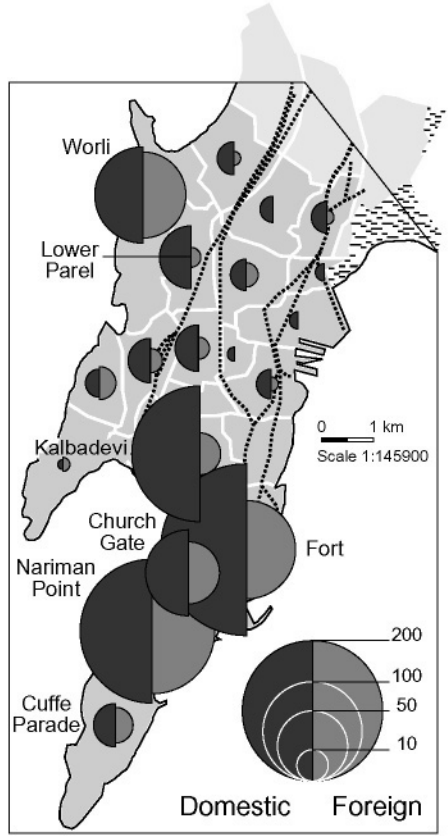


Figure 3-3A An Overview of Lower Mumbai's Economic Geography in 2000,All Companies Domestic and Foreign.

The current population of Greater Mumbai is around twelve million people. The average population density is an overwhelming 24,000 people per square kilometer.The Mumbai Metropolitan region forms part of the larger economic region in western Maharashtra that is sometimes referred to as the Mumbai-Pune corridor, one of the most industrialized, most urbanized, and most productive regions of India. Greater Mumbai itself consists of the 'city,' located south of Mahim Creek, and the suburbs that have gradually expanded northwards alongside the tracks of the Western and Central Railways. Further expansion on the mainland has been concentrated in Navi Mumbai (Jaqcuemin 1999). The railways are a key element of Mumbai's economic geography, said to account for five million passenger rides every day of the week.

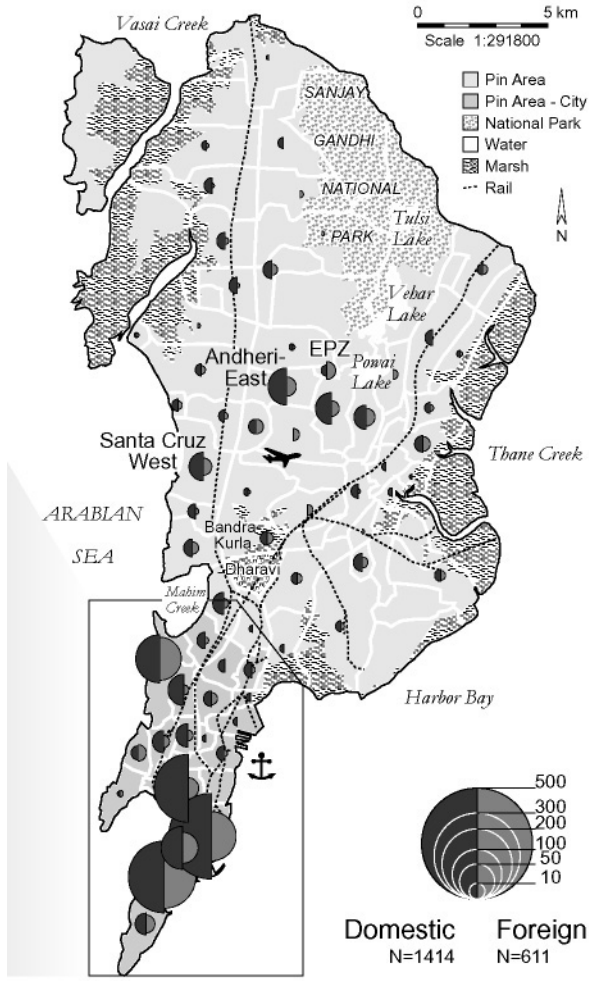


Figure 3-3 B An Overview of Mumbai's Economic Geography : All Domestic and Foreign Companies.

The geographical constraints of the island city put a premium on space and have historically influenced land values and land use in the city. There is a steep gradient in land values from the south to the north. In the mid-1990s, the influx of foreign corporations contributed to an extreme escalation of land values, making Mumbai for some time the most expensive city in the world (Nijman 2000b). The area of the present 'city'

and postal code areas (Mumbai) as the spatial units of analysis. In areas where there was a consistent spatial clustering of values among several contiguous areas, we decided to group them together into larger or less homogenous business districts. First, let us turn to Accra.

Figure 3-2 shows the high concentration of business activity inside Accra's Ring Road. We can identify several areas of concentration. First, Ussher Town is the traditional CBD and corresponds rather closely to the old European Town in colonial times. It is the most densely concentrated area in terms of corporate activities containing many high-rise buildings that are in close proximity to the ministries. It contains the second highest concentration of Ghanaian-controlled companies of any business district in Accra and a small number of long established foreign companies.

Second, the area labeled "Central Accra" includes Adabraka, Tudu, and Asylum Down. The area corresponds to the old "Native Town' from the colonial era. It contains Makola market, the largest market and the most crowded commercial area in the city and foci of most trips within the city. The bustling market spills over onto the walkways and roadways and leads to acute congestion. The area has a mix of corporate and residential functions, a visible presence of firms of Lebanese and Syrian descent, and a maze of side streets and back alleys. This business district has the largest share of Accra's domestic companies, though generally of small size. The number of foreign companies in this district is small except for a cluster of foreign airline offices.

The newest, and arguably most prominent, business district in Accra at present is an area that stretches from Osu along Cantonments Road to the Ring Road. It also covers the Ringway Estate, East and West Ridge areas. The entire district is not commercial, but corporate activities are concentrated in a ribbon development along the main thoroughfares. Much of this area was initially used for residential purposes, but since the introduction of liberalization policies, properties along the main roadways have been redeveloped for commercial purposes. The area has modern low-rise buildings with off-street parking and stands in sharp contrast with the colonial architecture of Ussher Town and the bazaar atmosphere of Central Accra.

Figure 3-3 gives a general impression of the foreign and domestic corporate geographies of Mumbai. The Fort area corresponds rather closely to the old European Town in colonial times. It has the highest concentration of Indian controlled companies, as well as a sizeable share of foreign companies. The area labeled as Kalbadevi corresponds roughly to the old Native Town from colonial times. It continues to breathe a distinct bazaar atmosphere. It is the most crowded area of its size in Mumbai, with well over 100,000 people per square kilometer (the highest anywhere in India in an area this size). It has a mix of corporate and residential functions and various ethnic neighborhoods. Much of the trade and retailing takes place in the open air in front of the small shops on the narrow streets and sidewalks. This business district has a large share of Mumbai's domestic companies, though generally of small size. The number of foreign companies in this district is small.

The newest, and arguably most prominent, business district of Mumbai is Nariman Point. This is the land that was reclaimed from the Arabian Sea in the 1950s. It is a small

sliver of land located West of the Maidan (across from the Fort and south of Churchgate), which measures slightly less than a square kilometer (about one-fifth the size of the Fort area, as defined above). Land values here are higher than anywhere else. Most of the construction is from the 1960s and 1970s. The modern high-rise buildings and broad avenues of Nariman Point stand in sharp contrast with the colonial architecture of the Fort and the bazaar atmosphere of Kalbadevi. Nariman Point ranks second in terms of its importance for domestic companies, and it is by far the preferred location for foreign companies (Figure 3-3).

Foreign companies in finance or producer services

We will concentrate our investigation at this point on the central cities of Accra and Mumbai. Figure 3-4 shows the locational patterns in Accra and Mumbai of companies in finance and producer services only. As indicated above, this is the fastest growing sector of the urban economy in both cities, particularly among foreign companies, and warrants a closer examination. In Accra, this sector involves particularly companies specializing in communication, real estate, advertising, and consulting. In Mumbai, all of these are important, but banking and finance companies are the most prominent. In both cities, finance and producer services are among the most spatially concentrated economic sectors.

In Accra, domestic companies in finance and producer services are most concentrated in Ussher Town and in Central Accra. The largest share of foreign companies, on the other hand, is found in the districts of Osu, Cantonments and the area around the airport. The heavily trafficked area along Cantonments Road in Osu (locally known as "Oxford Street") is the focal point for most foreign producer services companies. New paved roads, hotels, shops and restaurants have increased the attractiveness of the area for engaging in face-to-face business, an important aspect of producer services businesses.

In Mumbai, finance and producer services are strongly concentrated in the southern tip of the peninsula, more so than any other sector of the urban economy. The two main business areas are the Fort and Nariman Point, but their relative importance for domestic and foreign companies is not the same. The Fort has the largest share of domestic companies, while Nariman Point houses an overwhelming share of foreign companies.

This contrast is increasing over time. Since 1986, Nariman Point's share of foreign companies in this sector has been twice its share of domestic companies, whereas the Fort's share of domestic companies has been thrice its share of foreign companies in this sector. The area around Kalbadevi has about 10% of domestic companies and only 1% of foreign companies in finance or producer services.

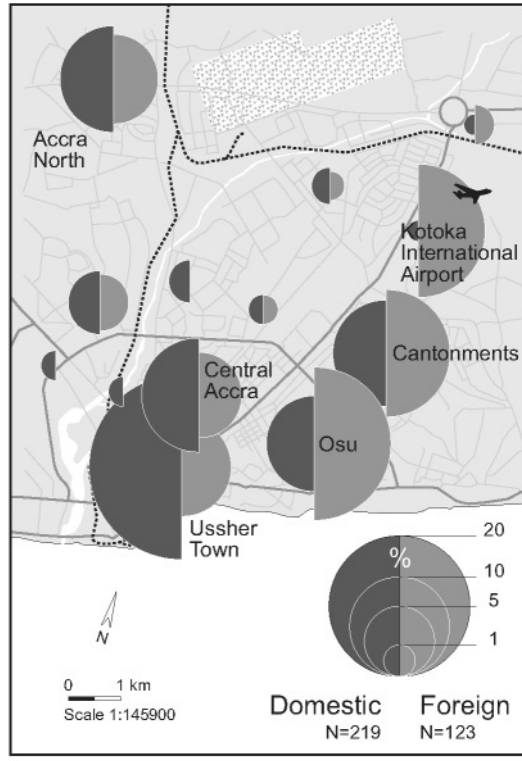


Figure 3-4 A The Geographic Distribution of Domestic and Foreign Companies in Finance and Producer Services in the Central City of Accra in 2000.

The rise of the global CBD

The foregoing analysis suggests the emergence of distinct business districts in the two cities. In both cities we can identify three CBDs that represent the main clusters of corporate command and control. In Accra, they are Osu/Cantonments, Ussher Town, and Central Accra; in Mumbai, they are Nariman Point, the Fort area, and Kalbadevi and its surrounding area. Within the two cities, these CBDs have different historical origins, they are different in terms of the nature of economic activity and, most importantly, they seem distinctly different in terms of their importance for foreign and domestic companies.

Central Accra in Accra and the Kalbadevi area in Mumbai are comparable as they overlap in large part with the old Native Town from colonial times. A small foreign company presence and a mixture of residential functions with small trade businesses, especially crafts, and retailing, characterize these areas.

Ussher Town in Accra and the Fort area in Mumbai are comparable as they correspond fairly closely with the European Town from colonial times, areas that were 'nationalized' after Independence. Their residential function is limited and they house many large domestic companies in the service sector and feature a substantial number of foreign companies.

Finally, Osu/Cantonments in Accra and Nariman Point in Mumbai are similar as they are relatively newly developed business areas. They are dominated by finance or producer services and they have the largest share of foreign companies in the two cities.

These business districts are differentially linked to the global economy. This is not only due to the variable presence of foreign companies. Domestic companies, too, are differentially linked to the global economy depending on their location within the city. Table 3-1 shows the global connectedness of domestic companies in the three most prominent CBDs in Accra and Mumbai. The table is based on a survey of randomly selected domestic companies in terms of size, ownership, sector, and location within each of the districts. The companies were questioned about their global connections in terms of phone calls, postal mail, business travel, and e-mail.

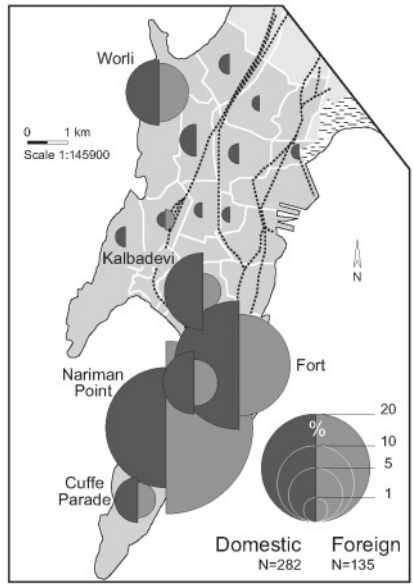


Figure 3-4 B The Geographic Distribution of Domestic and Foreign Companies in Finance and Producer Services in the Central City of Mumbai in 2000.

TheTable 3-1 shows that internationally oriented companies have a location preference that is different from more nationally or locally oriented companies. The domestic companies that are most linked to the world economy tend to locate in business districts with a disproportionately large share of foreign companies, or vice versa. Thus, domestic companies in Osu/Cantoments are more 'global' than companies in Ussher Town. The latter, in turn, are more 'global' than companies in Central Accra. In Mumbai, domestic companies in Nariman Point are more 'global' than companies in Fort and much more 'global' than companies in the area around Kalbadevi.

These findings are corroborated by other data obtained through the surveys. For example, phone calling patterns from the three districts show distinct differences in terms of the relative importance of local versus long distance call frequencies. Central Accra and the Kalbadevi area had the highest proportion of local calls while Osu/Cantonments and Nariman Point had the lowest proportion of local calls. Another indicator of the different degrees of 'globalization' of the business districts is the prevailing language. In a number of cases, field workers had to translate and read the questionnaire (composed in English) to the respondents. This occurred only in Central Accra (in about one dozen cases, all in Ga) and in the Kalbadevi area (in about thirty cases, in Gujarati, Hindi, or Marathi).

It appears, then, that the CBDs are integrated in the wider space economy at different scales. Corporate activity in Central Accra and in the Kalbadevi area tends to be oriented *locally* within the metropolitan area; in Ussher Town and in the Fort area it

Table 3-1. Global business connections in three business districts in Accra and Mumbai, based on surveys among a random sample of domestic businesses in the summer of 2000. Scores are indexed on the basis of the average value among the three districts (the raw score is provided only for the average, between parentheses).

ACCRA	Osu, Canton-ments	Ussher Town	Central accre	Average
Number of domestic companies surveyed	*50*	*47*	*112*	
International phone calls as % of all business calls	1.38	1.01	0.62	1 (06.7%)
International postal mail as % of all mail	1.31	1.12	0.58	1 (12.9%)
% of businesses with international business trips in past year	1.26	1.04	0.70	1 (65.2%)
% of businesses that have E-mail	1.13	1.11	0.76	1 (47.9%)
% of companies rating Osu/Cantonments as most prestigious	1.44	0.93	0.63	1 (40.5%)

MUMBAI	Nariman Point	Fort, Horniman Circle	Kalbadevi, Khetwadi	Average
Number of domestic companies surveyed	*94*	*112*	*113*	
International phone calls as % of all business calls	1.64	1.08	0.28	1 (02.9%)
International postal mail as % of all mail	1.41	1.14	0.46	1 (05.3%)
% of businesses with international business trips in past year	1.36	0.90	0.74	1 (18.0%)
% of businesses that have E-mail	1.35	1.14	0.51	1 (43.2%)
% of businesses rating Nariman Point as most prestigious	1.53	0.80	0.66	1 (57.5%)

tends have a *national* orientation; and a *global* orientation prevails in Osu/Cantonments and Nariman Point.

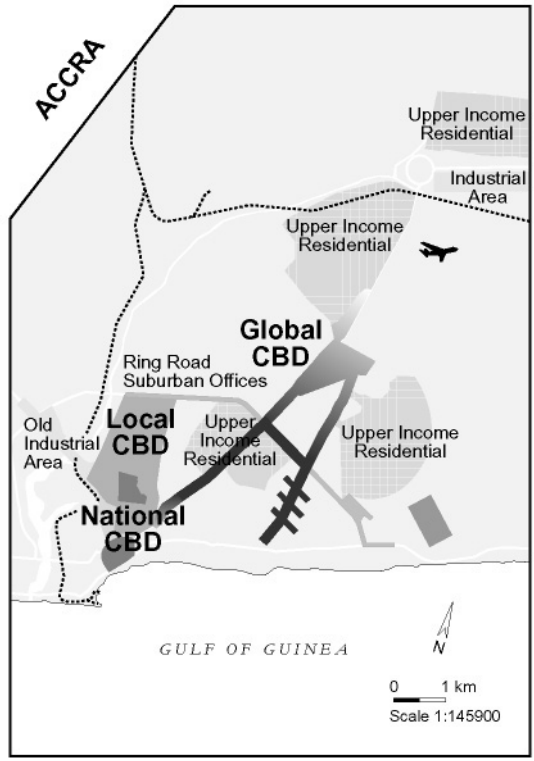


Figure 3-5 A A Schematic Representation of the Economic Geography of Accra during the Global Phase

CONCLUSIONS: A MODEL FOR THE GLOBAL ERA?

This chapter documented the changing corporate geographies of two post-colonial gateway cities. The cities are quite different from one another in terms of size, regional linkages, and cultural geography. But, their roles in the wider political economy have been comparable since colonial times.

Accra and Mumbai are presently in a global phase, which has been ushered in by liberalization policies. Globalization has resulted in powerful new imprints on the urban landscape. The global phase of urbanism is comparable to the colonial phase in terms of the clearly visible spatial articulation of external linkages in the urban economy

(compare Figures 3-1 and 3-5). The main difference in the contemporary period is that market forces rather than colonial spatial planning are driving the spatial formations.

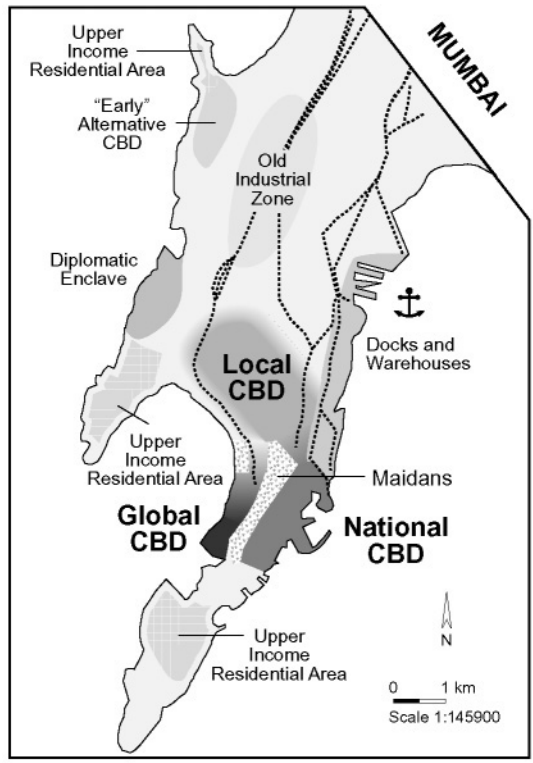


Figure 3-5 B A Schematic Representation of the Economic Geography of Mumbai during the Global Phase.

The corporate geography of the global phase of urbanism is based on the formation of three distinctive CBDs that are differentially linked to the global economy. Each of the three districts is integrated into the wider space economy at a particular scale. Naturally, this is a matter of degrees. Each of the three districts is to some extent integrated in the local, national and global economies. But each is primarily linked at one level. The local CBD has the highest concentration of small domestic company headquarters, the weakest ties to the global economy, and the strongest orientation to the urban area. The national CBD has the largest presence of big domestic company headquarters and a pronounced orientation to the economy of the country as a whole. Fi-

nally, the global CBD housed most foreign corporations and domestic multinational companies, and its main articulation is with the global economy.

More generally, the study's main findings may be summarized in three points. First, our empirical research shows the re-organization of the space-economy of the two cities. On the ground, these cities have changed structurally in the past fifteen years or so. Second, this change has not been random or accidental, but is tied very closely to the new roles of the two cities in the global political economy. Third, the study furthers theoretical understanding of global-local linkages. It does so especially by qualifying *place* (Mumbai, Accra) in historical and geographical context. We propose that post-colonial cities represent a discrete category in theorizing about cities and globalization.

We expect that the experiences of Mumbai and Accra are shared by other post-colonial gateway cities, each in their own context. In other words, many other post-colonial cities with a comparable past and with currently high exposure to the world economy are likely to experience more or less similar spatial processes. Cities that come to mind are Chennai, Jakarta, Mombasa, and Lagos.

Research and theory on urbanism in the lesser-developed world in the global era is at a preliminary stage of exploration. More study is needed to assess the general applicability of our findings. We also need to go beyond these corporate patterns and shed light on the evolving *human* geographies of post-colonial cities in the context of globalization. We hope that we have provided a basis for such future endeavors.

Acknowledgement:
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CHAPTER 4

COLOMBO AND THE PATTERN OF SOUTH ASIAN AND PORT CITY MODELS

ALLEN G. NOBLE AND B. L. PANDITHARATNE

While a large number of South Asian geographers have engaged in research on urbanization, much of their effort has been directed towards empirical studies and those of a clearly applied nature. Such an orientation is hardly surprising. These scholars understand the desirability of conducting research which immediately reveals information of a practical utility for countries struggling to reach full economic and social development. Gradually, however, some geographers as well as other scholars have recognized the importance of incorporating firmer methodological underpinnings in their work. For urban geographers, this has often meant attempts to extend descriptive model building as a theoretical basis for urban geography research studies. This chapter examines the Sri Lankan capital city of Colombo to determine how closely its early morphology follows that of other South Asian colonial cities. Does Colombo fit a South Asian urban structural model, or is another model more appropriate?

AMERICAN URBAN MORPHOLOGY MODELS

The formation of structural urban models was initially an exercise devoted to explaining American city form. A group of sociologists at the University of Chicago, led by E. W. Burgess, proposed in the early 1920s the first structural model (Park, Burgess and McKenzie 1925). Although strongly influenced by the particular situation of the city of Chicago, the so-called Burgess model was conceived broadly enough to apply to most North American cities, or at least their central areas. Alternatively termed the concentric zone theory, the model identified a series of concentric belts centered upon the focus of the downtown business area or central business district (CBD). Surrounding the CBD was a distinctive ring of different land uses termed the Zone in Transition. Outer rings identified a series of differing residential zones, whose population densities declined as one moved outward to the periphery of the city.

While the concentric zone theory worked well for the central areas of most North American cities, certain morphological elements, especially in the outer areas of the urban place, were ignored. The problem of a morphological model was addressed in the 1930s by a land economist, Homer Hoyt, who proposed an urban structure of radi-

ating wedges or sectors (Hoyt 1939). Although originally presented as an intellectual exercise to understand residential rent costs, it proved most useful to explain the pattern of other land uses as well. Proximity to, or remoteness from, various transportation routes provided the key. Combining the Burgess and Hoyt models began to allow investigators to approximate the morphology of most American cities.

Finally, two American geographers, Chauncey Harris and Edward Ullman, completed the major classical model offerings by proposing a multiple nuclei model. It explained morphology more successfully in terms of the effect of local nuclei, on the one hand, and the continued expansion of the urban place, on the other. Thus, certain facilities or institutions exerted enough influence to cause the development of subsidiary and dependent land uses in their vicinity. At the same time, earlier independent centers were often incorporated into an expanding city, while retaining their original land use pattern (Harris, and Ullman 1959, 281). Employing all of these models simultaneously, but each in different parts of the American city, provides a reasonable descriptive model.

Subsequent work on the structure of American cities has tended to focus on social conditions, ethnic settlement and urban activity spaces rather than on land use areas and functions (Vance 1977, 351-419). Many of these studies, while valuable in analyzing urban phenomena, have often lacked the particular geographical focus and universal applicability of the classical models.

SOUTH ASIAN URBAN MORPHOLOGY MODELS

Initially, South Asian geographers sought to apply classical urban morphology models to South Asian cities. Largely because of the sheer size of the country and the great number of urban places, most of the research dealt with various Indian cities. It was not surprising that Indian geographers, increasingly in mid-twentieth century trained in American institutions of higher education, should seek to utilize techniques with which they had become familiar in their graduate studies and which seemed to work so well. However, from almost the very beginnings of urban morphology research in India, the difficulties and deficiencies of applying the western models to India were apparent.

The problems were serious enough that R. L. Singh, who became a leading Indian urban geographer, did not even attempt to provide a structural model, although he identified and discussed what he termed “roughly concentric zones” for the city of Banaras (Singh, R.L. 1955, 42). One major problem he encountered was what to do with the cantonment section of the Banaras urban area.

A decade later Mansoor Alam (1965) did offer a structural model for Hyderabad, an Indian city with a cantonment. His model combined both the concentric circle method with the Hoyt wedge/sector approach (See Chapter 16 Figure 4-3). Mansoor Alam did not suggest that his model had greater application beyond Hyderabad, and other South Asian urban specialists have not applied it to other urban places.

Indian geographers seem to have come to the conclusion that the classical models have little light to shed on the morphology of Indian cities (Saxena 1970, 158). The overall shape of towns has been of equal interest to that of structure. Taneja (1971, 62-67) has offered a classification of cities based upon shape and including elongated or rectangular, triangular, circular, and amorphous. Alok Singh (1988) extended the list to include semi-circular and bell-shapes(see Chapter 16, Figure 16-6).

The American geographer John Brush (1968) concluded that none of the western structural models adequately explained the patterns of Indian cities. At about the same time, the British geographer, Arthur Smailes (1969) noted the most important fact that "assumption and theories about city structure tend to be culture bound" and hence not especially useful outside that culture. Cities should be viewed as a product of their milieu, not just cultural, but economic, political and historical.

Among the significant differences which may be cited are those of single versus double centered urban places, segregated functional land uses versus mixed land use, centrally located slum districts versus peripheral slum areas, homogeneity of language versus segregated language areas, presence or lack of urban sprawl and the discrepancy in length of time over which Western and South Asian cities evolved their distinctive forms.

RECENT APPROACHES TO SOUTH ASIAN CITY MODELS

Three studies, beginning in the late 1980s have produced descriptive models which help to solve the complexities of South Asian cities. The first was proposed by Dutt and Amin (1986), and later refined by Dutt (1993). Two models are proposed—a bazaar based city and a colonial base city. In addition, the authors noted that a few, but very important, cities were the outgrowth of organized planning efforts. Such cities which include New Delhi, Chandigarh, Bhubaneswar, Jamshedpur, and Jaipur, must be viewed as anomalies which do not represent the typical Indian cities. These large planned cities could easily be lumped together with canal colonies (Grewal 1991) and railway colonies (Dutt 1993) as a restricted urban form characterized primarily by their very regular grid patterns of streets and buildings.

Dutt's colonial base city (see Chapter 16, Figure 16-5) works well as a model for the Presidency towns and a number of the larger metropolitan centers. It does not fit the structure of some of the large number of medium-sized cities, however. It doesn't work very well for Hyderabad, for example. The basic problem still is incorporating the cantonement into the larger urban picture, unless it is included within the initial fort area.

The bazaar base city (see Chapter 16,Figure 16-4) also presents some problems. In truth, Dutt has captured the spirit of the city, but the model probably owes too much to western antecedents. The compulsion to employ concentric circles and wedges detracts from its real analytical value. What Dutt has recognized is that not all South Asian cities fit into a single mold. Whatever shortcomings Dutt's models may possess, they

represent the pioneering effort to present urban structural models which apply to a broad spectrum of South Asian cities. They are comprehensive yet easily understood. Consequently, they have received wide acceptance and have become the standard morphological approaches used by South Asian urban specialists.

The historian, Reeta Grewal (1991), also proposed a number of structural models, of which the first two, the indigenous town and the Anglicized town, have wide application. The other models are less important because they refer to specialized settlements found in Punjab province, settlements such as canal colonies. Grewal's indigenous town model, although meant to reflect cities in Punjab, shows the chaotic street pattern, the city wall and gates and the centrally located shops and residences of the wealthy which characterizes most South Asian cities.The British built facilities are added much as an afterthought.

The Anglicized town model is less successful.The central section is the indigenous town of the first model. To it is appended a number of symbols of British facilities including such places as the railway station, hospital, school, church and the administrative area known as the Civil Lines. The cantonement is stuck off in a different direction, still the feature that is difficult to reconcile.

The final set of models are those recently proposed by Noble (1998). The tentative use of pictorial symbols employed by Grewal forms the basis in Noble's models to help explain the patterns. The first model (Figure 4-1) illustrates the bipolar structure of most Indian cities. The old town (indigenous town, bazaar base city) is balanced by the Civil Station. Lying between is the open area in which the British typically erected many of their recreational facilities, i.e. the cricket ground, the botanical garden, the race course, the gymkana, and the golf course. The second model (Figure 4-2) incorporates an extensive contonement, with both a European town and an indigenous Indian town, having a pronounced Hindu orientation. As is the case with the North American classical models which need to be applied together to fathom the structure of North American cities, Noble's models should be applied simultaneous to particular South Asian cities. Each model clarifies the structure of a part of each city.

PORT CITY MODELS

T. G.McGee (1967) examined the functions and structure of colonial cities in the nearby and rather similar area of Southeast Asia.Although he did not offer a model, he did investigate several port cities "founded as pre-industrial settlements which, with the advent of colonial rule began to change their character, with the grafting on of Western urban forms" (McGee 1967, 65-66). His discussion of the form of Rangoon clearly fits the situation in Colombo. McGee identified Rangoon as a "typical colonial town"

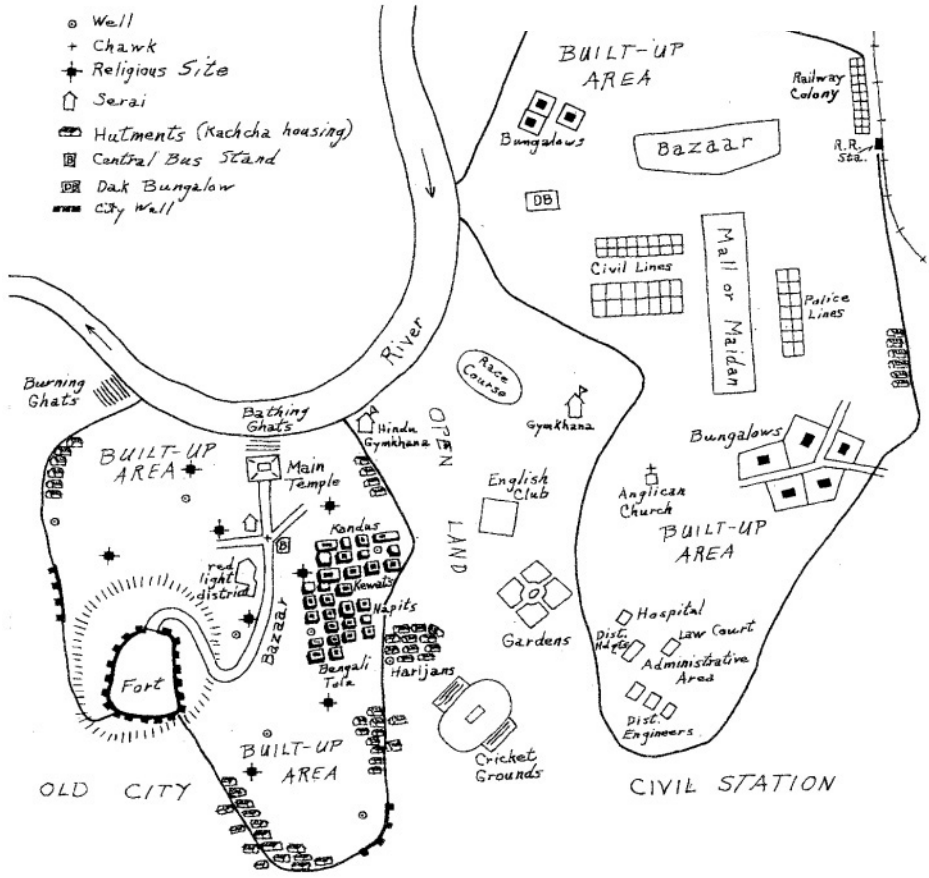


Figure 4-1 Noble's Model One.

with a "government commercial center", a cantonement and "military strong point", a European quarter, and most significantly an extensive area devoted to port, storage and trade functions. Each of these areas can be identified today in Colombo as holdovers from the British colonial period.

Another set of cities strongly influenced in their form by colonial factors, is the Concession-based cities of China (Dutt et al 1994, 42-43). Port facilities and extensive industrial areas vie with CBD commercial activities for space along, and in proximity to, the waterfront (Figure 4-3). The original high density "native" town is separated from these areas by lower density residential and office space much of which

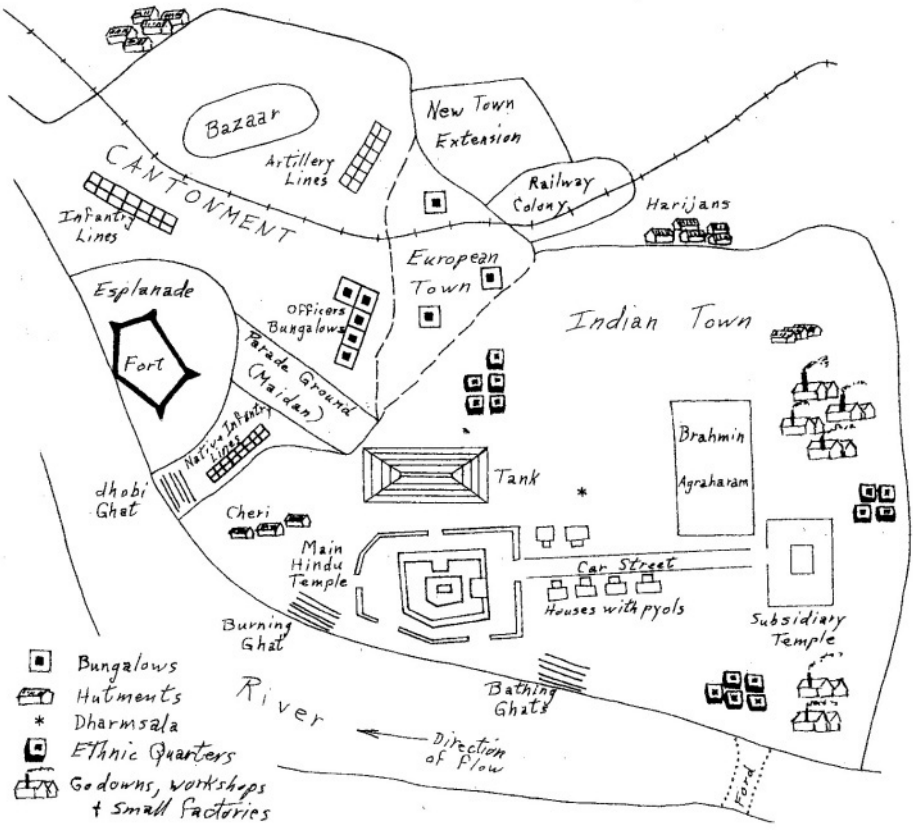


Figure 4-2 Noble's Model Two.

originally was the "concession" granted to foreign commercial interests. Again, many of these features, in somewhat modified form, appear in Colombo.

Finally, a Middle Eastern Port City model has been proposed by Soffer and Stern (1986). Examining coastal cities extending from Izmir, Turkey through Beirut, Tyre, and Sidon in Lebanon and Haifa and Acre in Israel to Alexandria, Egypt, the authors offered a descriptive model which stressed among other characteristics the growth or enlargement of the port facilities seaward, and the gradual development of dual foci.

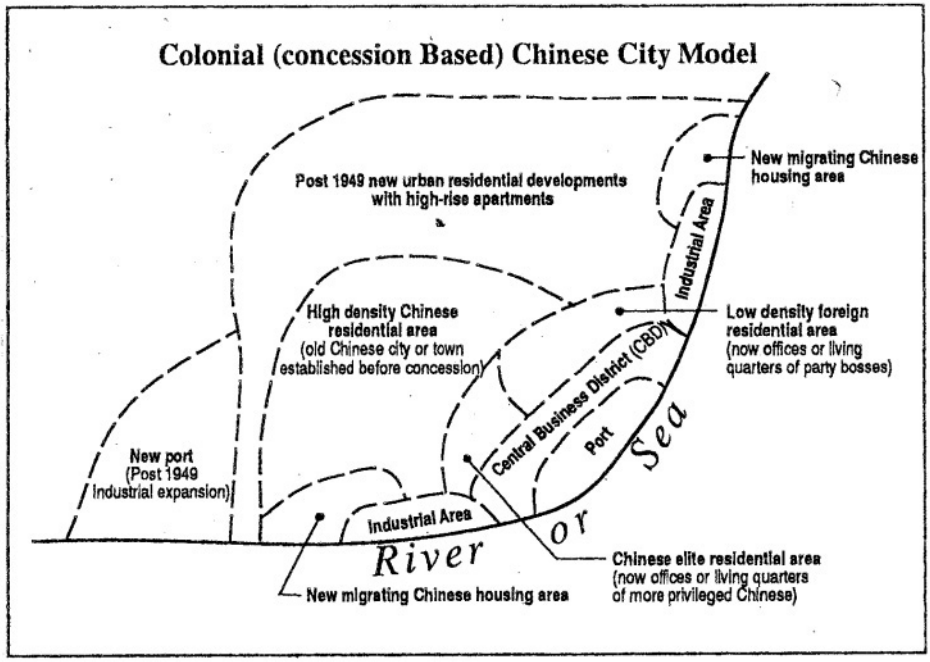


Figure 4-3 Model of Chinese Concession Port Cities(Dutt et al, 1994).

> On one side of the center, there will be elements that belong to the past, with less attractive areas developing on the rim of the CBD - businesses, work shops, industries, and poor neighborhoods. On the other side of the center will be found elements belonging to the modern part of the city, the more attractive margins of the CBD, the middle and upper-class residential neighborhoods and greater ethnic segregation . . . and relatively distant from the port facilities, recreation and beach areas will develop along the shore (Soffer and Stern 1986, 104).

Colombo shows an affinity for all three of these port city models or descriptions. The Southeast Asian and Chinese ports clearly demonstrate a colonial legacy, but the Middle Eastern ports also show a close connection to foreign influences, in some instances colonial, and in others the result of foreign settlements and the significance of on-going trade with overseas origins and destinations.

THE CASE OF COLOMBO

Although administered as part of the British colonial empire and lying in close proximity to India, Ceylon always maintained a separate identity. In part this was a reflection of its own unique colonial history which included early Portuguese and Dutch interludes. Only one scholarly study of urban structure exists for Colombo (Panditharatne 1976). His morphological zones are based largely upon various urban functions and land uses and do not attempt to fit the patterns into any larger system of models, either Western classical or South Asian. Two areas are left unclassified—the outer Pettah, which combined elements of both native and European towns, and a large area of marshy, undeveloped land due east of the city.

The "core" shown in Panditharatne's scheme includes two separate and distinct areas—the Fort and the Pettah. The colonial functions of the Fort are clear enough. Today the Fort area functions as the central business area of the city, in much the same way that the Fort does in Mumbai (see chapter 3). The Pettah demonstrates its antiquity from its name which is "an Anglo-Indian corruption of Tamil *Pettai,* meaning outside the fort (Perera 1998, 48) (see chapter 3 for a discussion of the similar area of Kalbadevi in Mumbai). This area functioned originally, and continues today, as the bazaar focus of the indigenous town. Gradually, in the colonial period Europeans built residences and civil structures in an area to the east of the Pettah. St. Paul's and St. Sebastian's churches are sometimes used to identify this neighborhood, as is the designation of New Bazaar. Without stretching truth too far, this area could be called The European Town. Perera (1998) labels the area as the Outer Pettah. Southeast of the Fort and across a largely artificial lake from the Pettah is the area known formerly as Slave Island. Military and police functions occupied large parts of this area in the colonial period. To the south lies Cinnamon Gardens, the center of European residential and administrative activity in the later British colonial period. The best residences of the city continue to be located here on well landscaped and spacious lots.

NINETEENTH CENTURY COLOMBO AS ANALYSED BY SOUTH ASIAN AND PORT CITY MODELS

Using the models of Dutt, Grewal and Noble the colonial structure of Colombo can be understood (Figure 4-4). At the same time, the unique configuration and site characteristics of the city require that the port city models be employed to more fully explain Colombo's particular situation (Figure 4-4). Colombo's form is in harmony with aspects of the South Asian city models. Slave Island, together with the Fort, performed a variety of military and quasi-military functions in the colonial period. Although not possessing all the features of an Indian cantonement, these areas contained the military barracks, parade ground, Royal engineers office, police lines and the bungalow of the commanding general (Figure 4-4).

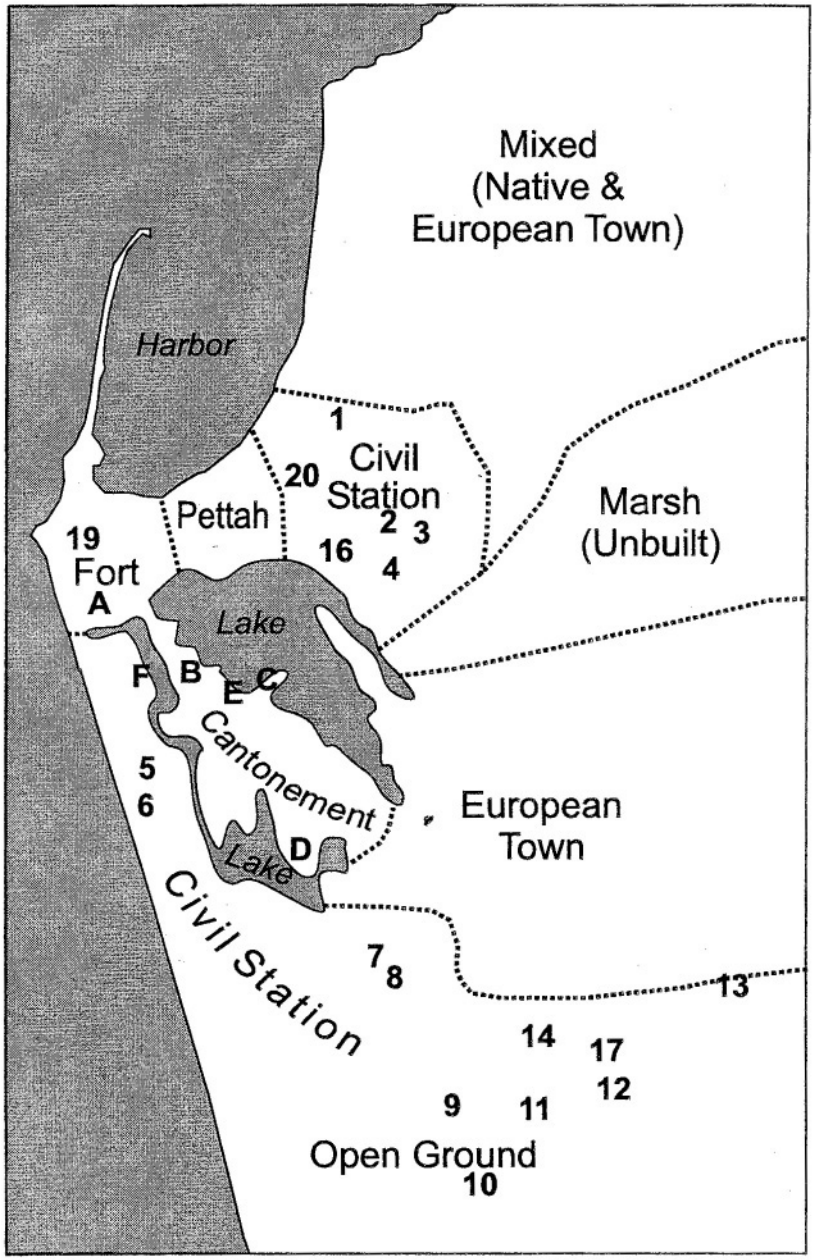


Figure 4-4 Sections or Areas of Colombo.

Key to Figure 4-4

A Military Barracks
B Old Parade Grounds
C Police Lines
D Commanding General's Bungalow
E Royal Engineers Office
F Military Hospital

1. St. Pauls (Wolfendahl Church)
2. All Saints Church (San Sebastian)
3. Law Courts
4. Prison
5. Colombo Club (and Cricket Patch)
6. Galle Face Hotel
7. Garden Club
8. Museum
9. Race Course
10. Parsee Cemetery
11. Lunatic Asylum
12. Hospital
13. Cemetery
14. Cricket Grounds
15. Golf Links
16. Governor's Country Lodge
17. Observatory
18. St. Joseph's College
19. Queen's House
20. Town Hall

The crowded Pettah, which was initially separated from the Fort by an outlet of Beira Lake later canalized in Dutch times, housed the small shops of retailers, crowded residential properties mostly on the first floor and the bazaar hawkers stalls (Panditharatne 1964). By contrast the European town is well represented by Cinnamon Gardens. Residences here are large and centered in compounds which are profusely landscaped. The avenues are straight and regular, in contrast with those of both the Pettah and the Outer Pettah.

The Civil Station appears in two separated areas (Figure 4-4). That to the north in the Outer Pettah is centered around All Saints church. It contained not only the church, but the Law Courts, Prison, Railway Offices, Royal College and the country lodge of the Governor (Perera 1999, 81). The other, larger area of Civil Station functions stretches from Galle Face south to beyond Cinnamon Gardens. Here was found Galle Face Hotel, the Colombo Club and adjacent cricket grounds, the Museum, cemeteries, hospitals and some facilities associated in India with the open space buffer zone between native and European towns, such as parks, gardens, cricket grounds, race course and the golf links.

With allowance for Colombo's particular situation, the city's layout fits, up to a degree, into the outlines provided by a combination of all three groups of South Asian urban morphology models. The Fort area is most difficult to accommodate because not only did it have elements of the South Asian cantonement, it also possessed features normally associated with the South Asian Civil Station. These included major hotels, Post Office, Customs House, Council Chambers and other central government offices including the Secretariat, banks and the Governor's residence (Queen's House).

The three port city models are also useful in explaining Colombo's form (Figure 4-5). The extensive port facilities, developed during the 19th century, lie to the north of both the Fort and Pettah areas and extend eastward along the shore of the harbor. Such a location agrees with McGee's discussion.

The dual nature of Colombo's urban structure accords well with Soffer and Stern's model. The Pettah, the old city, is adjacent to the oldest parts of the port. The commercial city, the Fort, is also close by. Panditharatne recognized the complimentary functions of these two areas by terming them collectively as "the Core" . As expansion of the city proceeded, two other sections developed. Panditharatne identified them respectively as "the inner mixed zone" and the "high class residential area" (Figures 4-5). Finally, an area of extensive land use with an emphasis on recreation developed toward the southern margins of the city. All of these areas and zones accord with the port city model proposed by Soffer and Stern.

Dutt's model of concession based cities in East Asia finds ready application in Colombo as well. The extension of the port and its close link with industrial facilities is replicated in the northern areas of Colombo. The CBD location adjacent to the port is demonstrated in Colombo by the proximity of the Fort and the Harbor.

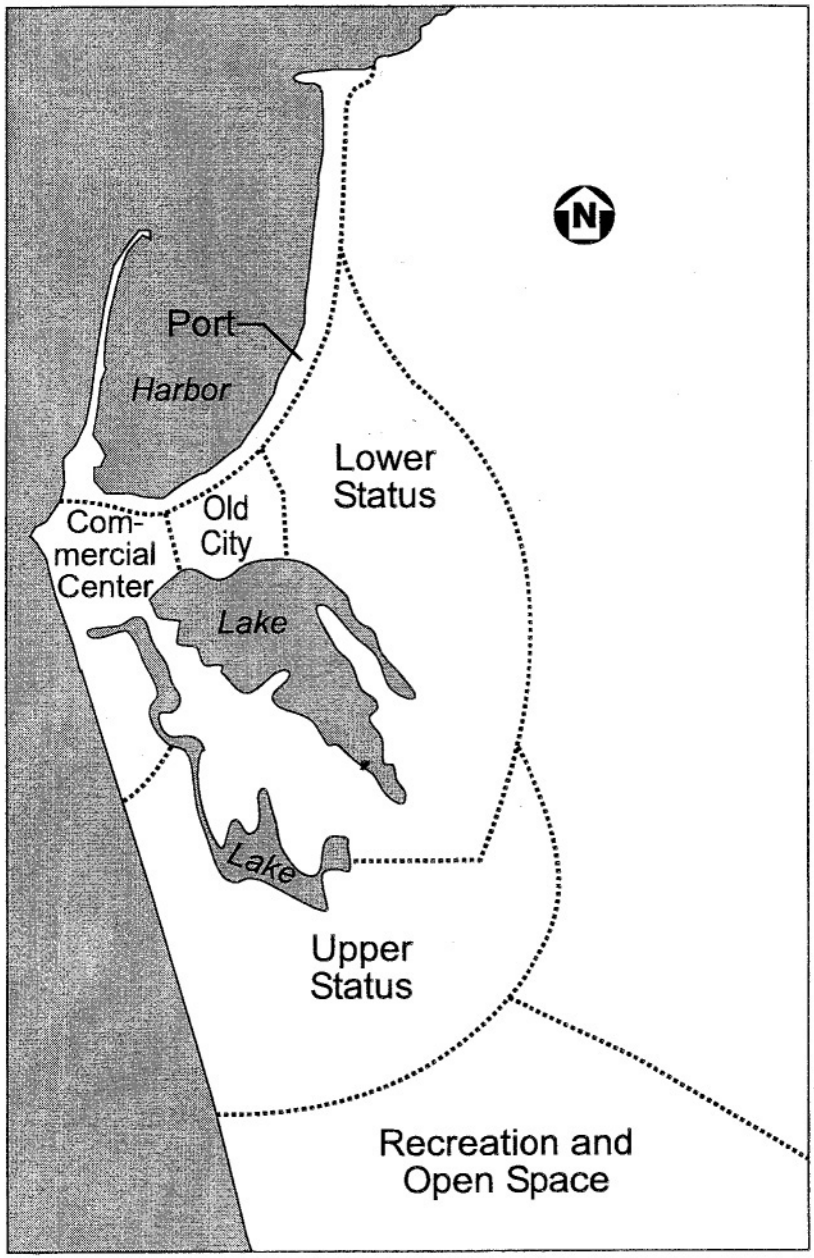


Figure 4-5 Colombo's Form as explained by Port Models.

CONCLUSION

Post independence growth has begun to obliterate the structural configuration evolved during the British Colonial Period. The Fort area is now a center of commerce and finance with much of the colonial administrative functions moved outward toward the periphery of the city. While what might be called the classic models of the South Asian city can still be applied, their utility becomes less and less with continuing urban growth. The port city models are most useful in discussions of Colombo's inner sections. Outward expansion has tended to make both types of models less appropriate. Perhaps it is time for new models to be proposed.

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CHAPTER 5

THE DEVELOPMENT OF HILL STATIONS AS URBAN CENTERS

WILLIAM C. RENSE

This chapter traces the history and development of the hill station as a feature of the South Asian landscape with the premise that these places will transform themselves from essentially seasonal resorts to urban centers with a modern and diversified economic base. Such a transformation already would appear to be occurring in the United States. This chapter discusses three hill stations from India and four from the United States. The urbanization of the American "hill stations" is analyzed in light of their past role as resorts and their current role as developing a modern "Service" economy based upon personal wealth and modern telecommunications. The American example is then applied to the Indian hill stations with speculation for their future development.

BACKGROUND

Areas of great natural beauty and/or pleasant environment have been sought and developed as centers of seasonal recreation and residence since ancient times, a fact testified to by the ruins of Pompeii and Herculaneum from the Roman era in Europe and many other similar sites. In both India and the United States, resorts developed during the 19th century. In India these places became known as the famous "hill stations" because of their upland locations. The upland "hills" were the only places that offered cool weather during the tropical summer of the Indian subcontinent and were thus found desirable by members of the ruling imperial British Raj. The United States, however, with its mid-latitude location, offered a variety of resorts with pleasant summers. These included seaside resorts along the coasts, lakeside resorts in the interior, and mountain resorts in the uplands. All of these were, in some ways, analogous with the Indian hill station, but in this chapter, only mountain resorts will be discussed or referred to as "hill stations."

The hill station as a colonial landscape feature was not limited to the Indian subcontinent, but was developed throughout the colonial tropics. Hill stations were common on the Malay Peninsula, in the Philippines and elsewhere. Crossette (1998) discusses many of the hill stations as developed in Asia.

Characteristically, an economy based on tourism and resort activity is narrow and limited. Most resort towns have small permanent populations and virtually everyone is supported by the tourist industry. Large numbers of seasonal workers from outside the

region must be hired for a few weeks or months. Chronic underemployment usually exists because of low labor demand during the off-season. All or most facilities close during part of the year and services are thus very restricted for months at a time. Furthermore, many of the facilities, such as motels, restaurants and other tourist services, are owned by "outside" money, or individuals who only live in town during the season, so profits are sucked away and do not remain in the local economy. Though generally not destitute by any measure, resort towns were often remote and offered few opportunities for economic development in the traditional industrial and pre-industrial economies of the past.

Today, in the United States, major changes are occurring in the traditional resort communities. The very factors that originally attracted tourists are now attracting permanent residents. Small resort towns are becoming small urban centers. Some resort towns have served as a magnet for regional growth and the development of nearby large urban areas. The reasons for this are the rising level of affluence in the United States and the development of the modern "service economy" with its sophisticated telecommunication system including the internet. Both individuals and businesses now have great freedom to select their place of residence or location. No longer do such classic economic factors as physical access to either resources or markets dictate site location in these industries. The former resort towns are becoming urban centers in their own right with productive, high-value and year-'round economic activity growing alongside the traditional seasonal activities of recreation and tourism. This growth and development has occurred specifically because many people now have the wealth and employment freedom to seek exactly what a resort town offers – a pleasant and attractive place to live with desirable elements of climate, outdoor activity and scenery, along with few social problems such as high crime rates or pollution. The role of amenities as a factor in regional economic development was anticipated by Ullman (1954) in a seminal article published almost 50 years ago. Thus, the economic and social functions of many resort communities have shifted from one of seasonal tourism/recreation to one of a much more complex structure incorporating relatively affluent and physically active retirement populations, the self-employed, consulting firms, and the utilization of telecommunications and the internet for business purposes.

HISTORY OF THE INDIAN HILL STATIONS

The famous hill stations of the Indian subcontinent have long been of interest to scholars. More recent studies of these places, and their role in the complex social structure of India during and after the British Raj, include those of Kennedy (1996), Kenny (1995), Crossette (1998), Wright (1991) and Mitchell (1972). The hill stations were originally developed as spas and sanitariums by the British, but they quickly developed into refuges for the Raj to escape the heat of summer. By the late 19th century, the hill station had become a microcosm of upper middle class British life complete

with teas, social calls, strolls, picnics, dinners, balls and so forth (Kennedy 1996). Members of the British Raj increasingly withdrew from the Indian lowlands, spending more and more time in the hill stations, thus isolating themselves from the people over which they ruled. Even the major administrative functions would locate for the greater part of the year (not just the high summer season) at a hill station rather than at the designated capital. Gandhi referred to this isolation of the Viceregal administration into Simla as "rule from the 500 hundredth storey."

Dutt (1993) recognizes three secondary urban forms from colonial times in India that need separate models to explain their modern urban development. These are the *c*antonment (a military encampment), the railway colony (regional headquarters for railroad operations and administration) and the hill station (originally health and resort centers). Dutt considers the long-term imprint of these three urban forms to be relatively minor.

Kennedy (1996) notes that historians tend to dismiss the hill station as of secondary interest and peripheral to the larger issues of British rule on the Indian subcontinent. But, it is Kennedy's contention that the hill station was a vital part of the British Raj. As he said, the hill station was neither a variant of the traditional Asian city nor of the colonial/post-colonial metropolis. It was a unique urban entity. What was often perceived as the frivolous and fantasy-like atmosphere of the hill station was, according to Kennedy, entirely functional to the operation of the Raj. Ironically, the basic factors of environment and political power increasingly attracted Indians to the hill stations. The eventual outcome, in Kennedy's words, "was the incorporation of the hill station within the compass of the Indian realm and their consequent destruction as special spheres of British bourgeois life."

The total number of hill stations may never be known. Kennedy (1996) identifies 65 of them. But Kenny (1995) lists 80 and Mitchell (1972) states that there were more than 90, including those that were established after independence. Whatever the number, the hill station always served the primary function of providing a place with cool weather, fine scenery and outdoor recreation as an escape from the stifling spring and summer heat of the lowlands. They serve that function today as they did during the days of the British Raj. However, to assume that there was only one type of hill station—that all hill stations were created equal, so to speak—would be a gross simplification. Mitchell (1972) divides hill stations into five categories ranging from the large, official and multifunctional hill stations such as Simla or Ootacamund, down to small, local "satellite" hill stations that serviced an unofficial, private clientele such as coffee planters or missionaries. The "official" hill stations were those that served as the seat of government during part of the year. Thus Simla, was the Viceregal "summer" capital of British India. The governments of the various provinces each had their own seasonal capitals in the hills—Darjeeling for the state of Bengal, Naini Tal for the United Provinces, Mahabaleshwar for Bombay, Ootacamund for Madras, and so forth.These "official" summer residences had the reputation of being formal and "stuffy."By contrast, there were several large, multifunctional hill stations without an officialrole.These constitute the second of Mitchell's five categories. Mussoorie in the Himalayan

foothills and Kodaikanal in the Nilgiri Hills are perhaps the two best examples.Today, some hill stations continue to function in an official capacity. Simla is the capital for the state of Himachal Pradesh. Others, including Simla as well as Darjeeling, Shillong and Ootacamund, have become entrepots for regional trade (Kennedy 1996).

The hill stations went into decline toward the end of the British Raj for a variety of reasons (Kennedy 1996). However, since independence, they have been revived by Indians as recreation and resort sites.

THE AMERICAN "HILL STATION"

The United States never had hill stations in the sense of British India. In the United States there was no colonialism as there was in India, no foreign minority ruling class that was interested in separating itself from the lives and culture of the ruled. In this way, "hill stations" in the United States developed as health and recreation centers used by people as spas, to escape the heat and humidity of summer, to engage in various outdoor recreational activities, or to enjoy areas of scenic beauty. They were egalitarian in nature, usually with accommodations catering to a range of economic classes and were thus unlike the more homogeneous hill station of British India. Economic status, not ethnicity, was the dominant factor in separating the facilities of the American hill station. There were, of course, some obvious exceptions. Until recently, there was discrimination against those who were not Caucasian or Christian in heritage. These marginalized groups, especially Blacks and Jews, had their own, separate resorts.

There are some obvious similarities between the hill station of the United States and the hill station of India. In both cases, many "hill stations" began as health resorts or spas. In both cases, the hill station evolved from a simple sanitarium or spa into a multifunctional resort used to escape unfavorable summer conditions of heat and humidity (i.e., Manitou Springs in the United States and Ootacamund, Simla and Darjeeling in India). In both cases, however, the role of health remained a strong attraction as people came to "take the waters" or try to recover their health in the cool, high altitude air. In both cases, many hill stations also developed important educational functions and some of these places remain educational centers to this day (i.e., Manitou Springs/Colorado Springs in the United States, Mussoorie/Dehra Dun in India). Furthermore, many hill stations in both India and the United States became closely associated with nearby or adjacent large urban areas, even to the point of being incorporated into the urban system itself. Thus it was with the Chautauqua and the city of Boulder, and Manitou Springs with the city of Colorado Springs in the United States. Often the growth of the urban area was originally stimulated by the presence of the hill station or by the same factors of physical environment that led to the development of the hill station in the first place.

SELECTION AND CHARACTERISTICS OF HILL STATION EXAMPLES

Three hill stations in India were selected for analysis. These are Mussoorie, Naini Tal and Ootacamund (Figure 5-1). These were selected because all three are currently well developed and very popular as resort centers, as well as being classic hill stations dating from the days of the Raj. Furthermore, none has an official government function today, as does Simla. Mussoorie is the nearest hill station to Delhi and is also closely associated with the developing urban area of Dehra Dun. As will be seen, Mussoorie has much in common with the American hill station of Manitou Springs. Naini Tal has the distinction of being one of the few Himalayan hill stations with a large, natural lake, Lake Nainital, which is one of a group of lakes on the fringe of Kumaun Himalaya (Kumar et al 1999).

Mussoorie is strung-out along the crest of a steep ridge at 1970 meters (6,464 feet), whereas Naini Tal (1938 meters, or 6,359 feet) lies in a valley with perhaps more room for future development. Ootacamund (now named Udhagamandalam) lies in the Nilgiri Hills of southern India (2286 meters; 7,500 feet) and thus serves an area far removed from the Gangetic Plain of the north. "Ooty" (as it is called) is close to the center of India's large high tech and computer industry at Bangalore (population: 4,000,000) and it is my contention that the high tech activities in Bangalore will spread and develop in Ootacamund.

In the United States, the examples of "hill stations" as selected for this chapter were limited to places in the mountains rather than coastal or lakeside resorts. This was done to maintain some topographic continuity with the Indian examples. Furthermore, it was decided that the American examples should be places that had a significant semi-permanent, though seasonal, residential population, as did the hill stations of India. Three places were selected: Manitou Springs, Colorado (adjacent to the city of Colorado Springs); the Chautauqua Park in Boulder, Colorado; and the Lake Tahoe Basin of California (Figure 5-2). A fourth place, Estes Park, Colorado, is used as an example of a transient tourist center that is also transforming into a residential, urbanized place.

CLIMATES OF THE HILL STATIONS

Climate played a fundamental role in the development of the hill station, both in the United States and in India (Table 5-1). A lowland example from both India (Delhi) and the United States (Dallas, Texas) has been provided for comparison purposes. Both the Indian and American hill stations are significantly cooler in the summer than are the lowland locations. In India, precipitation is relatively heavy at the hill stations, but many hill stations in the United States are significantly drier along with much lower relative humidity than the major population centers.

Table 5-1 Climatic Variables at Selected Hill and Lowland Stations

Stations	Elevation		Mean Temp. Month (Ht.)		Mean Temp. Month (Ct.)	
	Meters	Feet	°C.	°F.	°C.	°F.
Delhi	216	709	34.3	93.7	14.3	57.7
Mussoorie	2041	6,697	20.3	68.5	6.3	43.3
Naini Tal	1938	6,359	No Data	No Data	No Data	No Data
Ootacamund	2248	7,376	16.5	61.7	12.5	54.5
Dallas, Texas	148	486	29.8	85.6	7.6	45.7
Manitou/Col. Springs	1881	6,172	21.3	70.3	-1.4	29.5
Chautauqua/ Boulder	1659	5,443	22.3	72.1	0.4	32.7
Estes Park	2294	7,527	16.7	62.1	-3.5	25.7
Tahoe City	1898	6,227	15.9	60.6	-2.9	26.8

The winter weather conditions would be an important influence on year-round development. No matter how pleasant the summer, excessive cold and snow in the winter could prove an obstacle to attracting year-round residents. Of the three hill stations studied in India, Mussoorie and Naini Tal have relatively cold winters (Table 5-1) along with occasional snow and hard freeze, but not enough cold and snow to develop a winter ski industry. The winter chill could prove unattractive to a South Asian population used to subtropical and tropical conditions. Ootacamund, however, is sufficiently far south to escape winter snows and so does not suffer from this problem. All Indian hill stations receive heavy annual precipitation (Table 5-1), most falling during the monsoon season. This heavy rainfall could serve as a detriment to future urbanization since it may be viewed as an undesirable climatic aspect.

The American hill stations selected for this study, all have relatively cold winters. However, the winters in all places are sunny. In the Colorado locations of Manitou/ Colorado Springs, Chautauqua/Boulder and Estes Park, the average daytime temperature in winter rises well above freezing and is combined with abundant sunshine and low humidity. Winter snowfall at these locations is generally light and the ground is largely snow-free on most winter days. The Lake Tahoe Basin, however, is different. In contrast with the hill stations of India, this is an area of winter concentrated precipitation and heavy snowfall. Summers are almost rainless. The Tahoe Basin has thus developed into a major winter sports center that includes the Squaw Valley ski area, site of the 1960 Winter Olympic Games. Snowfall on the valley floor around Lake Tahoe is

upwards of three meters (almost 10 feet) per year with more than 10 meters (over 30 feet) falling on the adjacent Sierra Nevada mountains. Winter temperatures, however, are relatively mild for such a snowy location and there is abundant sunshine.

DISCUSSION OF AMERICAN HILL STATIONS

Manitou Springs

Manitou Springs(Figure 5-2) had emerged as a resort by the 1870s, an impressively early date in the western United States where the frontier was still in evidence at that time (Lee 1983). The primary attraction was the presence of mineralized springs whose waters were thought to have beneficial health qualities. The area also offered other attractions including waterfalls, the still wild American frontier environment, a delightful summer climate with low humidity and cool nights, and Pikes Peak. Pikes Peak (elevation 4,300 meters; 14,110 feet) is one of the best known landmarks in North America. It looms above the Great Plains to the east and is visible from more than 150 kilometers (90 miles) away. During the Colorado gold rush of 1859, the slogan used by the miners was "Pikes Peak or Bust." The view from the summit inspired Catherine Lee Bates to write the words now used in the patriotic song, "America the Beautiful." The construction of a carriage road, then a cog railroad, and finally a motor road to the top of Pikes Peak further added to Manitou's appeal. Both the highway and the cog railroad are in operation today.

Manitou Springs became a health center. In addition to the perceived medicinal benefits of the mineral springs, several sanitariums for the treatment of tuberculosis located in the area. It was thought that the dry, clean air of the mountains was helpful in the treatment of this then common disease. In its history as a spa and health center, Manitou Springs thus mirrored the early growth of many Indian hill stations such as Ootacamund and Darjeeling (Kennedy 1996).

By late in the century, Manitou Springs had emerged as a major resort with numerous hotels and rather up-scale shops. As early as the 1870's elaborate summer homes had appeared, and by 1877 Manitou had a national reputation as the most popular summer resort and health spa in the West (Lee 1983). Mecum (1926) quotes letters referring to the "dearest little summer homes" nestled among the trees.

Manitou's growth was closely tied to the arrival of the Denver and Rio Grande Railroad. By the 1880's there were as many as five trains per day arriving with visitors and there were special places to park the elegant, private railroad cars of the rich (Daniels and McConnell 1973). In this way, Manitou's history was similar to the Indian hill stations whose growth and development also benefited from the development of the railroad on the Subcontinent (Kennedy 1996). Many visitors before World War I came for stays of a month or more and there was a significant semi-permanent, seasonal population (Lee 1983).The Breckenridges (1985) describe how the "guests of Manitou" came and stayed all summer, arriving by train and bringing their maids, butlers and babysitters. These people came from Texas and the Midwest, but Kansas City seems

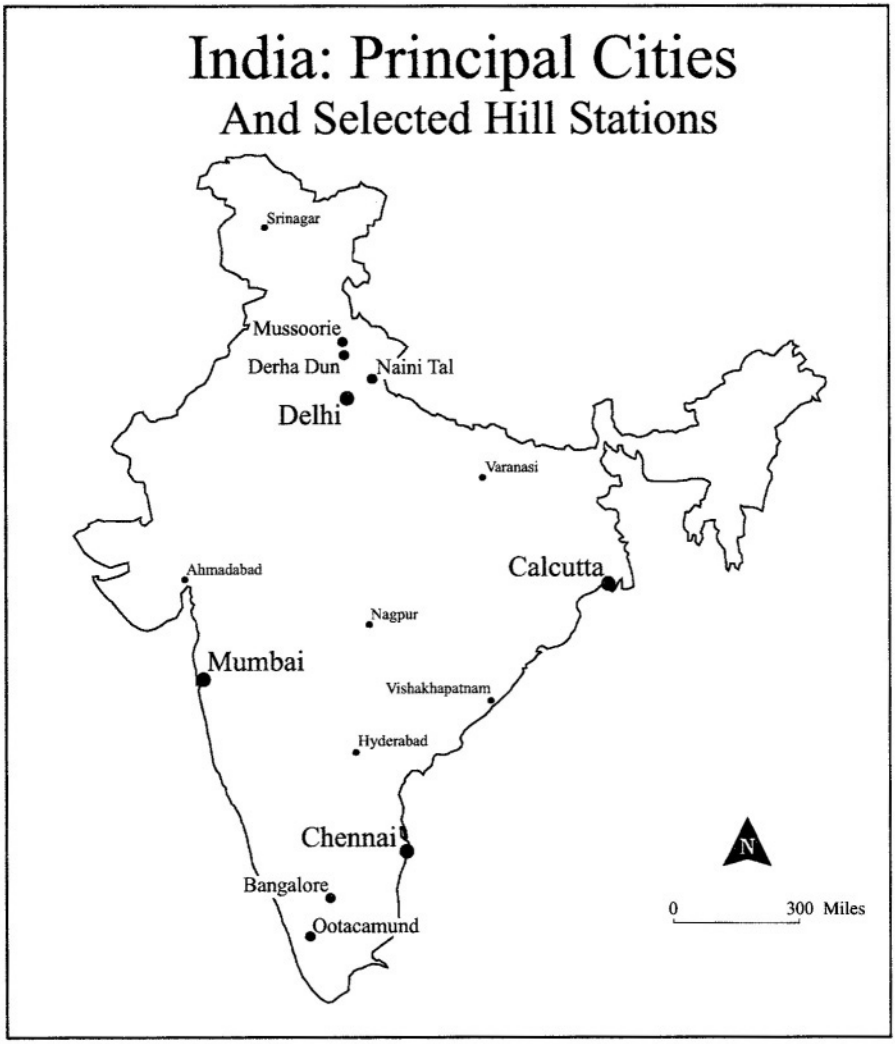


Figure 5-1 Selected Hill Stations and Important Cities of India.

to have been a particularly important origin. Early in the 20th century a special train would run from Kansas City to Manitou Springs to bring out the families at the beginning of summer, and a special train would run back to Kansas City at the end of the summer.

However, Manitou Springs is crowded into a narrow valley at the base of the mountains, so growth shifted a few kilometers eastward, to the city of Colorado Springs. The growth and development of Colorado Springs occurred due to the actions of William Jackson Palmer and his railroad, the Denver and Rio Grande, which entered the area in 1870. It is an interesting observation, in light of the growth of hill stations in India due to the presence of the British ruling elite, that many English immigrants played a very important role in the early development of Colorado Springs. Indeed, at one time, there were so many English living in Colorado Springs that it was referred to as "Little London" (Lee 1983). The early history of the Colorado Springs area is well discussed by Sprague (1971).

Today, Colorado Springs has become the major growth center while Manitou Springs remains a small but busy resort. Colorado Springs has boomed for the same reasons of physical environment, delightful climate and scenic beauty that led to Manitou's growth more than a hundred years ago. At an elevation of over 1800 meters (5,900 feet), "The Springs" (as it is called locally) has dry air, abundant sunshine, a low annual precipitation (under 400 mm; 16 inches) and stunning scenery dominated by Pikes Peak.

The population of Colorado Springs is now 350,000 and the population of El Paso county is approaching one half million. The dependency on the military, education and high tech industries is reflected in the list of major employers (Greater Colorado Springs Economic Development Corporation). Of the top ten employers in the Colorado Springs area, four are military related. Of the top 20 employers, seven are high tech or telecommunications industries. This list includes the United States Air Force Academy and the headquarters for NORAD, the major military defense system for North America. Many retired military personnel live in the area. As will be seen later, the relationship between Colorado Springs/Manitou Springs and Dehra Dun/Mussoorie is striking.

Chautauqua Park

"Chautauqua" parks became popular in the United States late in the 19th century. They were designed to provide school teachers with a pleasant, affordable summer vacation place along with a schedule of opportunities for intellectual and spiritual growth including Bible study, lectures in the sciences and humanities, concerts and love of nature. At that time, school teachers were notoriously underpaid, often being compensated "in kind" (room and board) with very minimal salary. They could thus not afford to stay at many of the popular resorts of the time. The first "Chautauqua" was established at Lake Chautauqua in New York and soon the "Chautauqua Movement" spread across the United States.

The Chautauqua in Boulder, Colorado, was established in 1898, a year in which there were more than 150 "Chautauquas" scattered across the United States. The Colorado Chautauqua is one of the few to have survived to the end of the 20th Century.

Its history is thoroughly described by Galey (1981). The Chautauqua (and the City of Boulder) lie right at the base of the Rocky Mountains, with mountains to the west and the Great Plains stretching out to the east. Chautauqua is scenically attractive with pine-covered mountains and the dramatic rock formations known as the Flatirons rising directly behind. There is a fine vista eastward across the Great Plains. The high crest of the Front Range with peaks over 4,000 meters (about 13,000 feet) in elevation, small glaciers, permanent snowfields, hiking, fishing and hunting lies only 30 kilometers (18 miles) to the west.

From the outset the Colorado Chautauqua had been established and oriented toward school teachers from Texas. Over the years, the families of these teachers, and others, built or purchased cottages on the Chautauqua grounds. Families would come up from Texas in the early summer and stay until Labor Day in early September, the traditional end of summer in the United States. Many of these families had become wealthy over the years and, as late as the 1950's and early 1960's, one would note the arrival of the Texas families with the children and the traditional Black governesses in their white uniforms.

Today, the Chautauqua facility is managed by the Colorado Chautauqua Association and still offers series of lectures, concerts and other cultural events for the general public. The Colorado Historical Society (1995?) has identified a total of 88 cottages still in use on the Chautauqua grounds. Of these, 59 (67%) are now owned by the Colorado Chautauqua Association and are available to the public for lease or short-term rental. Six of the cottages are owner-occupied on a year-round basis and one is owned by the City of Boulder. Of the remaining 22, the old ties to Texas are still in evidence. Fourteen of these cottages (63.6%) are still owned by residents of Texas. Three are owned by residents of Colorado, two from Louisiana and one each from Florida, Oklahoma and Washington, D.C.

The Chautauqua Park is now fully incorporated into the City of Boulder. At the time Chautauqua was established in 1898, Boulder was a small town serving adjacent agricultural and mining areas. It had become the site of the University of Colorado, an educational institution still in its infancy. Today, Boulder has burgeoned into a wealthy and active city of 90,000. Boulder County has a population of a quarter million. The University of Colorado leads a host of educational and high technology industries in the area. This growth has occurred here specifically because of the same climatic and scenic attractions that drew the Chautauqua 100 years ago.

Of the 13 employers in the Boulder area with more than 1,000 employees each, four (31%) are research or education oriented and three (23%) are high tech. Included in this list are the University of Colorado, the National Center for Atmospheric Research, Ball Aerospace Technologies and IBM Corporation. More than 50% of the largest employers in Boulder fall into the modern education-research-high technology economic pattern. The remaining major employers include four public services (as city and county governments, school districts and hospitals), one bank and one company specializing in organic foods. The Chautauqua/Boulder area fits the mold of a small place with seasonal tourism transformed into an important urban area dependent on

modern economic activities. The physical attractiveness of the area has drawn and stimulated those types of industries. There is a tight labor market in the high technology area, and being able to locate in an attractive environment has now become an important factor in recruiting employees.

Estes Park

Estes Park developed as the supply and resort town at the eastern entrance to the Rocky Mountain National Park in Colorado. It is some 120 kilometers (75 miles) northwest of the City of Denver at an elevation of around 2300 meters (7,500 feet). Estes Park never had the large, semi-permanent seasonal population found in Manitou Springs, the Chautauqua Park, or in the hill stations of India. Estes Park was always a tourist center focusing on the short vacation of a few days or weeks rather than catering to the season-long dweller. Furthermore, the town literally closed down in winter and, as recently as the 1960's, it was sometimes impossible to find a restaurant or café open after Christmas. All that has changed.

Estes Park is now a place of 7,000 permanent residents, certainly not yet an "urban area" in the strict sense, but it is growing rapidly and is adjacent to Colorado's booming "Front Range Corridor". Many new residents seem to be upscale economically and include relatively wealthy and physically active retirees. Many new residents work in the nearby cities of the urbanized "Front Range Corridor" that extends north and south from Denver. Others are engaged in consulting or businesses that utilize modern telecommunications. This growth is certainly related to the urbanization of the Front Range Corridor, the presence of many high technology and educational institutions in the region, and access to the major airport (a hub for United Airlines) in Denver. However, the residents of Estes Park must have specifically chosen this location for its mountain amenities since there are many intervening residential opportunities within the Front Range Corridor. Data from the United States 1990 Census indicate that 37% of the labor force is employed in either the executive-administrative-managerial or professional specialty sectors. Seventeen percent of the labor force is self-employed.

Lake Tahoe

Lake Tahoe and the Tahoe Basin are in the Sierra Nevada mountains and constitute one of the most dramatically beautiful sites in North America. Today, the population of the basin has reached 57,000 and is growing rapidly. Problems of traffic congestion, air pollution and water pollution have become serious. Of particular concern is the protection of water quality in Lake Tahoe itself. The Tahoe Basin lies on the border between the states of California and Nevada (Figure 5-2). It not only has a flourishing summer trade, but has developed a major winter sports industry as well. Casino gambling and entertainment have been developed on the Nevada side of the lake and the facilities here have a national reputation along with Reno and Las Vegas. Lake Tahoe developed as an important summer resort during the 19th century (Landauer 1997; Stollery 1969). Tahoe's development was closely associated with the city of San Francisco some 300 kilometers (about 200 miles) to the west. Wealthy San Franciscans built large summer

homes and estates on the west shore of Lake Tahoe as early as the 1880's (Landauer 1996). Many of these estates still exist and are used by wealthy families today. There were also tourist facilities catering to a less wealthy population as well.

The attraction of Lake Tahoe to the wealthy San Franciscan was not that of a cool summer climate, but rather a sunny, warm and dry one! Summer weather at Lake Tahoe is almost rainless with around 90% of the possible sunshine. Days are warm, nights are very cool and the humidity is low. Excellent opportunities exist for both water and land-based recreational activities. By contrast, San Francisco has a notoriously chilly, damp summer with winds sweeping off the cold waters of the Pacific Ocean. The American author, Mark Twain, once wrote that the coldest winter he ever spent was a summer in San Francisco! It was thus daytime warmth and sunshine that Lake Tahoe offered, and it offers these amenities to this day.Today, in the Tahoe Basin's largest urbanized area, South Lake Tahoe (California), 20% of the labor force is engaged in the executive-administrative-managerial or professional specialty sectors of the economy. Nine percent are self employed.

Recent Growth

All of these American hill stations have grown rapidly in recent decades (U.S. Bureau of the Census). The population of Colorado Springs has grown by 4 times in the last 40 years (70,000 to 300,000 residents). Estes Park has tripled its population during this same period with most of the growth starting after 1970. Similar growth levels have occurred around the Chautauqua in Boulder. The town of South Lake Tahoe wasn't even an incorporated place in 1960, and has doubled in population since 1970. It can be seen from these American hill station examples that rapid population growth has occurred in recent decades. Since this growth can not be explained by traditional economic and locational factors, it is probable that this growth has been stimulated by the presence of the "hill station" and its associated climatic and scenic amenities (Ullman 1954). People move to these places *because* of the climate, *because* of the scenery. The resulting economic development is modern and oriented toward research and development, telecommunications, private consulting and other specialized professional services, and education. The role of relatively young, active and wealthy retirees, often starting a second career, would seem to be important. There is no indication that this trend of rapid growth in these "hill stations" is slowing down—indeed, it may be accelerating. In light of the growth and change that has occurred in the status of the American hill station, it would not seem unlikely that a similar pattern of growth and development could be expected in South Asia as well.

INDIAN HILL STATIONS

Mussoorie

Mussoorie, population 30,000, lies on a narrow ridge of the Himalaya north of Delhi. It is the closest hill station to Delhi. Established since British times, it is very

popular today as a resort. There are views of "the snows," as the High Himalaya are called. In terms of scenery and location (near Delhi), it would be a prime place to undergo rapid urbanization. However, growth and development may be constrained by the steep nature of the local topography. Not many kilometers away, though, at the base of the mountains, is the city of Dehra Dun.

The similarity between Dehra Dun/Mussoorie and Colorado Springs/Manitou Springs is striking. Just as topographic factors limited the physical expansion of Manitou Springs thus diverting growth to nearby Colorado Springs, growth may be diverted from Mussooorie to Dehra Dun. Dehra Dun offers quick access to the mountains around Mussoorie, just as Colorado Springs offers quick access to the area around Manitou Springs. Dehra Dun and Colorado Springs each have a population of around 350,000. Both places have a strong military influence and both have been popular for retired military officers. Educational institutions are important in both cities, as are technology and research facilities. Dehra Dun is the site of the Forest Research Institute, the Royal Indian Military College, the Indian Military Academy, the Survey of India, and the prestigious Doon School. Though not high enough to escape the heat of the Indian summer, Dehra Dun is still located at an elevation of almost 700 meters (2,300 feet). It is several degrees Centigrade cooler than Delhi and offers a quick escape up into Mussoorie for a day or a weekend. I predict rapid economic growth in the Dehra Dun/ Mussoorie area over the next few decades based upon the region's attractiveness to high technology, research and development, education and telecommunications industries.

Naini Tal

Naini Tal currently has a population of 31,000 and lies at an elevation of over 1,900 meters (6,200 feet). It is solely a tourist and resort location and is typically "dead" during the off-season. Temperatures and precipitation are similar to those of Mussoorie, which lies at a similar elevation. Naini Tal is unique among hill stations of north India in that several large, natural lakes lie in the vicinity. Lake Nainital is the immediate attraction and has undergone environmental degradation including pollution and siltation. Naini Tal is less topographically restricted than Mussoorie. Because of the unique aspect of the nearby lakes, I predict that Naini Tal will begin to develop its own non-tourist oriented economy. Growth will be stimulated by the arrival of modern, year-round economic facilities again related to telecommunications, consulting and the self-employed professional classes, wealthy retirees and so forth.

Ootacamund

Ootacamund (Udagamandalam) lies in the Nilgiri Hills of South India. "Ooty" has become a regional entrepot with a population of 85,000, so it has developed activities beyond those of seasonal tourism. Ootacamund already has developed an industrial base that adds to its commercial and business-like nature. This growth has been related

to common and traditional economic factors of regional supply and exchange, as well as its established seasonal tourism industry. Natural attractions near Ootacamund include the Mudumalai Wildlife Sanctuary, the Bandipur Tiger reserve, Nagarhole National Park and Wynaad National Park. Together, these facilities constitute one of the largest protected woodlands remaining in India.

Environmental problems around "Ooty" as a result of the tourist industry are, unfortunately, considerable and have been documented by Miriam (1998). Steep slopes have been scarred and leveled for hotel development. Pollution levels in Ooty Lake are so high that eutrophication has occurred, together with severe weed problems. No fish survive in the lake. The seasonal nature of the tourist industry has resulted in an overload of the infrastructure, especially water, sewer and roads. Similar problems exist, or could develop, at other Indian hill stations.

The long-term growth of Ootacamund, and of other hill stations in the area of the Nilgiri Hills, would certainly appear to be related to growth of India's major and important high-tech industries in Bangalore, some 300 kilometers (186 miles) to the north. Bangalore is known as the electronics and computer capital of India and has a population of 4 million. The last 20 years has seen a boom in telecommunications, aerospace, defense, electronics, computer and light engineering industries. In the context of the American experience, these are exactly the types of industry that spread into hill stations or indirectly stimulate their growth. Furthermore, the south of India has a reputation as being India's most progressive region with literacy levels about twice the national average and English as a widely spoken language (Crossette 1998). It would be very surprising, therefore, if Ootacamund and other regional hill stations do not undergo rapid and significant growth and development within the next two decades. Kodaikanal, an historic hill station about 200 kilometers (125 miles) from Ootacamund, is already undergoing rapid growth, but its residents claim that they have not been "ruined" by excessive and poorly planned development as has "Ooty."

CONCLUSION

This chapter has outlined the development of the hill stations of India and drawn analogies with "hill stations" in the United States. In the last two decades, several of the American "hill stations" have undergone rapid growth with economic development based on activities other than seasonal tourism. This includes the attraction of relatively wealthy and "young" retirees, self-employed professionals, consulting groups and businesses making use of modern telecommunication. Those factors of climate and scenery that originally led to the development of the hill station as a tourist center are exactly the factors that are drawing permanent residents today.

India is currently developing a modern economy and this is bringing a rapid rise in personal wealth. India has numerous hill stations dating from the British era which continue to exist as important and popular resort centers. As yet, most of these hill stations have economies based upon seasonal tourism. Following the example from



Figure 5-2 Selected Hill Stations in the United States.

the United States, it may be expected that many of these Indian hill stations will undergo significant growth over the next few decades. As it has been in the United States, this growth will probably be stimulated by relatively affluent and educated individuals who seek a quality and type of lifestyle that is offered only in the hills.

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CHAPTER 6

COMMUNICATIVE PLANNING PRACTICE IN AN UNDEMOCRATIC SOCIETY:HONG KONG CASE

YU-HUNG HONG

In recent years, a new planning approach has emerged. Scholars, such as Forester (1993, 1989), Healey (1996), Hoch (1997), Innes (1995, 1999a, 1999b), and Throgmorton (1993, 1996) are taking a pragmatic approach to conceptualizing planning practice that focuses on the communicative dimensions of policy debates and collective actions. Influenced by Habermas's ideas of "practical discourse," these scholars argue that treating planning as a communicative enterprise promises to bring a democratic way of policymaking to society (Healey 1996, 236). They also believe that a dialogue-based form of planning could be a critical arena for officials to invent and test different democratic structures (ibid, 253).

Although Western planners and scholars have begun to accept the new approach as a real possibility, the applicability of this idea to planning in developing countries remains understudied. There are two questions. First, Amdam (1997, 343) argues that one precondition for practising communicative planning is the existence of political institutions that are under domestic control. If that is true, how useful is the new planning idea for developing countries where democratization is still at an initial stage? Second, the proposed communicative planning practice is essentially a program of actions—meaning that it encourages planners to image or create future institutional environments that could facilitate non-violent conflict resolution. Advocates, however, do not provide any framework for practitioners, especially for those who are working in developing countries, to identify disabling factors that could hinder them from building required institutions for communicative planning. Without such a framework, how can planners in developing economies decide if this new planning approach is possible in their countries? This chapter explores these issues using Hong Kong as a case, using a theoretical framework for explaining why involved parties in two land-use conflict incidents did not resolve problems by discussing their differences peacefully. The framework is an assimilation of Habermas's (1984) practical-discourse concept with Hirschman's (1970) exit-voice idea. It compares the possibility of reconciling policy disputes through quality discourse with other mechanisms, namely public protest and government coercion. Because this framework treats all mechanisms as equally possible, it helps identify what competing strategies are available and how an existing institutional environment makes public protest and coercion become more attractive tactics than persuasion for dealing with conflicts. This understanding may assist

policymakers to devise institutions for communicative planning practice. As argued earlier, this kind of theoretical framework is missing in the literature.

Certainly, I cannot generalize the applicability of the communicative planning approach to developing countries based on one case. Rather, my goal here is to add one more case study to the current rapidly expanding research efforts in this interesting topic. With the accumulation of enough case studies in the future, we will be able to determine how we can apply the new planning idea to situations where democracy is underdeveloped.

THEORETICAL FRAMEWORK

At least, three approaches exist to co-ordinating human behaviors and mediating social conflicts. In addition to "markets" and "power," discussed later, there is the Habermasian discourse-centred concept of conflict resolution. Habermas's idea focuses on the communicative rationality in speeches and public debates and the enlightenment of self-interest. For Habermas (1984), rationality does not come from the self-reflective consciousness of an individual or the maximization of one's own interest. Rather, it is a product of intersubjective discourses. Put differently, participants of a debate could only validate a rational claim based on rational discussions. Through debates, they can uncover topics of relevance, interpret values, question and transform their predisposition, generate good reasons, and debunk bad ones. In this process, participants will continue to see different dimensions of the debates and transcend their personal interests to accommodate others' positions until the best argument prevails. Habermas (1984) argues that these discourses can occur under an "idle speech situation" when communications between involved parties are comprehensible and sincere because they contain the substance of truth and rightness. These communicative interchanges are called quality discourses. This philosophy is the foundation of the communicative planning approach.

There are debates over the practicality of Habermas's ideas. Most critics believe that his ideal speech situation is utopian (McCarthy 1996). Benhabib (1990, 358), however, argues that Habermas's proposal is realistic. She illustrates her argument with an example: We sometimes teach our children to handle their conflict by saying, "What if other kids pushed you into the sand, how would you feel then?" This practice of putting ourselves into another person's position shows our cognitive competence in trying to understand other people's feelings, change our perception, and accept different opinions.

To capture what is theoretically distinctive about quality discourse as an approach to resolving disputes and why some people are blind towards its distinctiveness, one must compare quality social discourse with other modes of human-interactions. The two other modes can be characterized metaphorically as markets and power. Hirschman's exit-voice thesis which deals with these two mechanisms, is combined with Habermas's practical-discourse concept to formulate the framework used in this study.

Exit, Voice, and Loyalty

Exit means that a person withdraws from a transaction when a better commodity or service is available (Hirschman 1970). The use of exit to influence decisions and behaviors is not limited to transactions carried out in markets. When scholars apply the concept of exit to social and/or political exchanges, they treat it as a metaphor that represents the use of "separation" and "competition" to co-ordinate human relations. For instance, a couple may try to settle their family dispute through a divorce. People may migrate to other countries because of deteriorating political conditions of their home country, if there is no restriction on migration. Others may withdraw totally from public spheres and stop paying attention to politics and public affairs.

Instead of flight (exit), people may decide to fight (voice). Voice is the attempt to change the management of an organization through individual (or collective) petitions, appeals to higher authority, or public protests (Hirschman 1970, 30). While exit may impair the organisation's chance of recovering from deterioration due to the abandonment of its members, voice may improve the performance by providing a direct feedback to an entity.

Although voice may be a direct and informative way of alerting an organisation or a person about performance, it is neither pleasant nor easy. A neglected spouse must have the courage to confront the other partner and express the true feeling about their marriage. This may, in turn, reveal the vulnerability and emotional dependence of the neglected party in the relationship. At the political level, voice may even be dangerous because many governments may not be willing to accept criticisms brought forth by their citizens (Hirschman 1992, 79).

In addition, the effectiveness of voice depends on its "volume." Decision makers of a firm or a political organisation may not listen to a grievance unless the issue is conveyed to them collectively. In comparison to exit that can be co-ordinated impersonally by competition, voice is costly in terms of the time and efforts needed to organise protests or other collective actions.

The combination of exit and voice as a strategy can either supplement or contradict each other. On the one hand, exit can reinforce voice when it is used as a threat to end a relationship if the performance does not improve. The threat of a divorce and a boycott of a product are good examples. On the other hand, a total abandonment may undermine voice if a repressive government allows dissents to leave their country voluntarily or involuntarily. Departures of dissents would weaken (and may eventually dissolve) the force to challenge the existing regime. The government may become more, rather than less, oppressive.

Hirschman (1970, 76-105) stresses that total abandonment is impossible because of loyalty. Loyalty is a sense of belonging, trust, and responsibility that members possess towards an entity. This attachment will delay an immediate exit although conditions are degenerating. If the loyalty is not "blind," loyalists will try to improve the situation through voice. Loyalty, therefore, will avoid an over rapid exit and, in turn, gives a government, an organisation, or a person an opportunity to correct problems.

Persuasion in Quality Discourse and Loyalty

Although Hirschman discusses the role of loyalty in shaping the performance of an organisation, he does not show how members can develop this sentiment. He does not explain how parties can generate a trust relation among themselves and become loyal to the group. In addition, Hirschman implies in his writing that voice is limited to confrontation as an expression of discontent. This presumes that parties cannot derive a consensus over a disagreement through persuasive and reflexive discussions. This is the gap in Hirschman's ideas that Habermas's concept of practical discourse can fill. As mentioned earlier, instead of "raising voices" to one another, Habermas (1984) believes that people can reconcile their differences through quality discourse. His idea illustrates how people can create mutual understandings, trust relations, and eventually loyalty.

Hirschman also does not discuss how to enhance voice. O'Donnell (1986, 251-252) identifies this issue and draws the distinction between "vertical" and "horizontal" voices. Vertical voice is the conveyance of discontent to "the top" through public protests. Horizontal voice is the utterance and exchange of opinions among citizens, which resembles Habermas's practical-discourse and public-sphere concepts (Calhoun 1996; Habermas 1989). Horizontal voice is a precondition to mobilize vertical voice because the effectiveness of public protests depends on the number of participants. Organizers must persuade enough people to join their rallies using horizontal voice. The more persuasive is the cause of their appeals, the larger is the number of people who will join. More supporters will then engender the necessary voice for protectors to shape public policy. In essence, persuasion generated through quality discourse is a critical strategy for shaping people's actions. Because Hirschman does not include persuasion as a strategy in his framework, Habermas's concept of quality discourse could complement his exist-voice ideas.

Coercion and Voice as Power Relations

Power as a social relation is partly imbedded in the concept of voice in Hirschman's discussion. Voice, for him, is the exercise of power by citizens in a civil society, which is only one kind of power execution. According to Foucault (1978, 92-94), however, power can be exercised from innumerable points, and there is no one system of domination. In reality, power relations exist within the family and workplace, between gender, and among races. In addition, whenever a person misuses her/his power, the action may generate resistance from other people. Because power can be exerted from different spheres in a society, such as the state or the civil society, resistance is not confined in a single domain (Foucault 1978, 95-96; Bowles and Gintis 1987, 97). Using this definition, the state can also exercise power to achieve its objectives. This definition is most useful for a discussion of the Hong Kong cases. In most countries, people delegate a certain degree of their power to the state for the provision of public goods and the maintenance of public order. From the delegation of power, the state acquires its authority.

Hirschman only touches upon the plurality of power and resistance implicitly. A framework that contains only one kind of power—voice—would not be sufficient. Voice will only identify the resistance from citizens in the form of public protests. To account for the power exercised by the government, we need a broader framework. Because power is a structure or a relation, it is not a strategy; instead, how and when to exercise a person's power is a strategy. To avoid any confusion, the government's strategy to exert its power to force citizens into accepting its rules is coercion. For actions taken by the public, Hirschman's original idea of voice characterizes the exercise of civilian power.

In sum, exit, voice, persuasion, and coercion are the four main strategies in the framework used in this chapter. The framework places Habermas's practical-discourse concept into a wider perspective that accounts for other competing modes of social interactions, namely competition and power. It also extends Hirschman's exit-voice idea to include persuasion and coercion as possible strategies for co-ordinating human relations.

This is by no means an exhaustive list of possible strategies. On the contrary, it seems unlikely, in principle, that the set of strategies is closed. Nevertheless, the goal here is not to identify all possible strategies. Rather, the purpose is to explain why parties involved in a conflict choose voice and coercion, instead of persuasion, as strategies to solve their disputes. The current framework seems adequate to perform this task.

Putting all these strategies into one framework helps us realize that the choice of using persuasion to resolve social conflicts will depend on the attractiveness of other available strategies. The attractiveness of each strategy is determined by existing institutional arrangements within which parties make their tactical decisions. If existing institutional arrangements nurture an unfair policy-making process and asymmetric power relations, parties involved in policy disputes will be prone to use voice and coercion to deal with their problems. The plausibility of resolving conflict peacefully through quality discourse will be overlooked. The remainder of this chapter illustrates these relationships by analyzing two cases of planning disputes in Hong Kong.

THE CHOICE OF HONG KONG

The reason for choosing Hong Kong as a case is that its political system is not democratic. When Hong Kong was a colony, the British government appointed its governors. After the British returned Hong Kong's sovereignty to the People's Republic of China in 1997, the central government appointed a special committee to elect the Chief Executive of the Hong Kong Special Administrative Region. Although there were direct elections in the past, they were only for electing a limited number of legislators at different levels of the government, such as the Legislative Council (LegCo), Urban Council, and District Broads (Miners 1991). For example, in the 1998 election,

the public could only elect 30 percent of all legislators for the LegCo. Professional groups—doctors, teachers, labor unions, and lawyers—and a Beijing-appointed committee selected the rest of the councillors.

Because the masses possessed only limited power to determine the appointments of politicians and officials, the government had employed a top-down approach to formulating public policy. In most cases, bureaucrats enjoyed a high degree of autonomy in handling policy. Public participation and scrutiny were kept at a minimum level.

The reunification of Hong Kong with the PRC, however, changed the population's attitude towards politics (DeGolyer 1997, 216-245). At present, the people in Hong Kong are aspiring to an open and accountable government. Citizens are more vocal than ever before in expressing their concerns about government policy. Political parties are also debating whether Hong Kong needs to speed up the pace of democratization. Because Hong Kong is undergoing a rapid democratization, it is an ideal case for assessing if the communicative planning approach is applicable to such a situation.

In Hong Kong, the government deals with all planning matters according to the legal framework specified in the Town Planning Ordinance (TPO). The TPO empowers the government to set up a Town Planning Board (TPB) that drafts the Outline Zoning Plan (OZP), review issues related to the plan, and approves any subsequent modifications. The department that implements and enforces rules specified in the TPO and OZP is the Planning, Environment, and Lands Bureau (PELB).

Like other countries, all land developments in Hong Kong must conform to the OZP. Regulations contained in the OZP apply to both public and private development projects. The enforcement of OZP relies on contractual agreements established in land leases and the Building Ordinance (Tang and Leung 1998, 153-169). According to the TPO, the PELB needs to notify and consult the public for any changes made to the OZP. There will be a public consultation period for soliciting comments and opposition from affected parties after the PELB approves an application for changing land uses. Yet, the government has not been able to utilize fully this opportunity to invite public inputs for land policy making. Officials and developers are afraid that public participation may lead to delays of their development projects and, even worse, social disputes. As for the public, they are normally not interested in expressing their concerns during the public consultation period. They view the process as tokenism because the government asks for their opinions only after it has approved applications for landuse modifications.

In 1991, planners in Hong Kong tried to amend the TPO, requesting statutory power for prosecuting land developments that did not conform to the OZP. In the proposed bill, the consultation period would occur in the beginning, rather than at the end, of all development projects. The intention was to allow private and public developers to identify all potential opposition before finalizing their projects. Due to objections raised by private developers, the Legislative Council did not pass the bill into law.

In short, the Hong Kong government does not conduct planning in an open and democratic manner. Power relationship between the government and the public is asymmetrical. Officials who have the knowledge about when and why land uses are altered do not always disclose fully this information to the public. Without being fully in-

formed, affected communities have very limited ability to participate and monitor landuse planning. When residents in a community find out that a development project will affect their livelihood or property rights, they organize public protests against the plan. These protests could develop into a prolonged controversy and eventually extend the completion time and costs of the project. What follows is an analysis of two cases that have these problems.

TWO PROBLEM CASES

The two cases examined here are related to conflicts over the government's decision to build a rehabilitation center and an AIDS clinic in two private residential estates in Hong Kong. On the one hand, these facilities will guarantee the right of some exmentally ill and HIV carriers to receive public health services. On the other hand, from affected residents' viewpoint, the presence of these facilities could lower the value of their houses and hence violate their private property rights. Unable to balance the rights of both groups, the government was involved in a series of prolonged controversies with two local communities. During their confrontations, instead of attempting to understand each other's arguments, both parties tried to manipulate the debate. While public officials framed the debate as an issue related to discrimination against the mentally ill and AIDS patients, the communities treated their protests as actions against government hegemony. Framing their problem differently hindered the possibility of resolving the conflict through quality discourse. As the following sections will show, involved communities in these cases mainly chose voice as a strategy to express their discontent. In response, the government countered their tactic with coercion.

Although quality discourse did not occur in the two cases, there were opportunities for the parties to engage in such discussion during these incidents. Had the parties gripped these chances to discuss their differences rationally and search for a common ground, they probably could have compromised with each other and solved their conflict peacefully.

Information about the two cases was gathered from personal interviews conducted in Hong Kong between January 1997 and April 1998, relying on memories of interviewees, which could sometimes be unreliable. To validate the consistency of the information, it was crosschecked against materials collected from government documents and newspaper clippings.

Rehabilitation Center in the Laguna City

The Laguna City is a private housing estate located at Cha Kwo Ling in Hong Kong. (Figure 6-1.) It is a middle income neighbourhood with multi-storey apartment buildings overlooking Victoria Harbour. Next to the estate is the Laguna Park that separates the complex from the noise and air pollution generated by factories in the

Kwun Tong Industrial Area. A shopping center and a well-connected transportation network are also available to serve the community. Many people consider this housing estate as one of the better places to live in Hong Kong. In 1992, the tranquillity of this affluent neighborhood was disrupted by the government's announcement to build a rehabilitation center for the former mentally ill there (Tang 1992).

Originally, the government planned to build a bus station on the site selected for the rehabilitation center. Yet, when it constructed a four-storey building on the top of the bus terminal, residents began to recognize that the additional facility would be used to serve the former mentally ill. Some residents were afraid that such a facility would invite many ex-mental patients to visit their estate. There were past incidents in other areas that people who suffered from mental sickness hurt or even killed their families and neighbors (*Wah Kiu Daily News*, 1992). Because of these experiences, some residents described the rehabilitation center in their neighborhood as a "ticking time bomb." Property owners immediately formed a task force to organize public protests against the government's project.

Interplay of Strategies. Starting from the beginning, the residents chose to use voice as a strategy to oppose the project. They did not plan to move to another area (exit) because they believed that they had a legitimate reason to resist the center. They claimed that the government did not consult them before it decided to build a rehabilitation center in their neighborhood. Although there was a consultation with members of the Kwun Tong District Board, officials did not specify that the location of the center would be in the Laguna City (Tang 1992). Instead, they said that the location would be in Sat Tso Wan—an area about 450 meters away from the Laguna City. In addition, during the consultation period, many residents had not moved into the estate yet; therefore, the government did not give them the opportunity to express their opinion about the development of the center (Lee 1993).

Residents also did not think that the use of persuasion in dealing with officials would be possible. There was a deeply rooted perception among the residents that the government disrespected public opinions. The perception was best illustrated by a comment made by one active organizer during the time of the incident who I interviewed in 1998. She said, "These bureaucrats have no respect to our rights. If they cared, they would have asked for our opinion first before they finalized their plan for the rehabilitation center. Officials said that they would be willing to talk to us. Yet, nothing happened. The only way to make the government recognize our demand is to bring the issue to the public." Driven by this mentality, the residents publicized the issue through press conferences to put public pressure on the government.

Facing the opposition from the residents, the government did not want to select another site (exit) for two reasons. First, selecting a new site would incur high financial costs because of the delay and changes of the development plan. Not only would the government waste all the resources and person-power spent on the existing plan, but it would also have to compensate contractors for their financial losses caused by the delay. Second, the government believed that no matter where they relocated the rehabili-

tation center, the selected community would reject it. In view of these reasons, the government decided to coerce the Laguna-City residents into accepting the facility.

Government officials first used persuasion (horizontal voice) to enlist public support. They framed the issue as a case of discrimination against the mentally ill. In a series of newspaper articles and a radio interview, officials of the Social Welfare Department and the Health Department asked the public to endorse their plan. They labelled the residents' opposition as a discriminatory act against the mentally ill (*Wah Kiu Daily News* 1992; Chan 1993; Ming Pao 1993; Lee Chi Hun 1993; *Hong Kong Daily News* 1993). At a special meeting held by the Welfare Panel of the LegCo, the then Secretary for Health and Welfare, Elizabeth Wong Chien Chi-lien, delivered a passionate speech. She said, "I seldom take such a firm stand. Yet, I am really angry this time….If we yield to those unreasonable people out of fear, Hong Kong people should be ashamed of themselves (Ming Pao 1993)." She also asserted that she would not retreat this time because it was a matter of justice. If she failed, she would resign. Her speech won a wide support from legislators. They allowed the Health Department to proceed with its project.

The government's strategy worked. Members of the Social Worker Union and the Movements Against Discrimination began to criticize the residents as prejudiced and ignorant. Legislators also asked the government to set up educational programs to eliminate the public's biases towards the mentally ill (Li 1993; Ho 1993). They argued that the discharged patients would not bring any harm to the neighborhood. Living in a community was a critical stage for these patients to recover fully from their sickness after a period of confinement. Societal acceptance would help them to return to their normal lives.

After all the publicity, the residents were in a disadvantageous position, getting very little sympathy from the masses. With the public on its side, the government did not see the need to establish a discourse with the residents. Although top officials stated that they were willing to talk, the two parties kept postponing their meeting (*Sing Tao Daily News* 1993, 15).

As debates between the two opposing parties became increasingly antagonistic, the residents filed a complaint against the government's decision to the Office of the Commissioner for Administrative Complaints (OCAC). The OCAC was responsible for handling public grievances about government policy. In principle, officials of the OCAC would act as independent investigators to examine the legitimacy of complaints put forward to the agency by citizens. There was, however, no statutory requirement for other government departments to adopt OCAC's recommendations if the agency found faults in their designs or implementations of public policy.

According to a document obtained from the OCAC, the agency found that the government did not have sufficient consultation with the residents. Yet, without any detailed explanation, it agreed with the government that the selection of the project site was appropriate. With no recommendation from the OCAC to either alter its existing plan or conduct an additional public consultation, the government decided to proceed with its project despite the residents' opposition.

Owing to the unyielding position of the government, the residents vowed to fight against the center to the end. They decided to bring their case to their representative in the LegCo. The politicization of the issue exacerbated, rather than eased, the already very tense relationship between the government and the residents.

Political Parties' involvement. Initially, Li Wah-ming, the legislative councillor who represented Laguna City at that time, supported the residents' actions. He asked the government to suspend the project until the Welfare Department conducted a further consultation and investigation (Lam 1993). Immediately, legislators who represented the interests of social workers criticized Li's suggestion. As a democrat and former social worker, Li was under the pressure from the Social Worker Union to take a firm stand against discrimination. In January 1993, although Li knew that he would lose the support from some voters in his constituency in the 1995 election, he changed his mind and endorsed the Welfare Department's plan (Cheung 1993; *Express News* 1993).

Unable to get any help from their representative in the LegCo, one organizer joined the Liberal Party—a competing political party of Li's. Members of the Liberal Party in the LegCo, such as Selina Chow Liang Shuk-yee and Lam Kui-chun, started to criticize Li for failing to represent the interest of his constituents. They argued that building the facility in Laguna City was unfair for the community because there was already a psychiatric center in the neighborhood. They also asserted that there was not enough public consultation and urged the government to stop imposing its will on the residents (SCMP 1993).

The involvement of political parties in the issue complicated the situation. Some legislators perceived the Liberals' involvement as a political strategy to win for their party another seat in the LegCo (Lam 1993; SCMP 1993). The organizer who joined the Liberal Party was also accused of pursuing his own political ambition to run against Li in the next election (Maher 1993). Regardless of whether these accusations were valid or not, the politicization of the issue changed the original focus of the dispute. Instead of searching for a way to build a rehabilitation center without intruding upon the residents' private property rights, the residents and officials shifted their attention to party politics and political struggles. This development further undermined the possibility of establishing a peaceful discourse between the conflicting parties.

Outcomes In February 1994, the rehabilitation center began to accept patients. There was no high-profile opening ceremony because proponents of the center were worried that the presence of either the Governor or the Chief Secretary would draw a fierce protest (Gittings, Wong, and Chow 1994). The opening of the clinic did not stop the residents from protesting. They tried all means to make patients who visited the center feel that they were not welcomed to the neighborhood. They photographed and videotaped visitors when they entered the center. In addition, protestors hired additional security guards to prevent anyone who did not have a resident's identity card from entering their premise (*Eastern Express* 1994).

The series of confrontations led to a "lose-lose" situation. For the ex-mentally ill, although the government succeeded in building a rehabilitation center for them, the

facility lacked the friendly environment for them to readjust to their normal lives. Their neighbors were hostile to them, and this could instill in their minds a feeling of rejection by society. The Laguna City residents also could not get what they wanted. Despite all their efforts to fight against the center, they still had to learn how to live with it. Because they maintained the same attitude towards the mentally ill, they were haunted by the fear of seeing these patients in their neighborhood. Their attempts to protect their private property rights did not improve their living quality or values of their homes; instead, the whole episode made them feel bitter about how their government and politicians dealt with the issue.

Although quality discourse was absent, examining the case more careful revealed moments during the incident that such a communication could have been possible. There was a time when the Director of the rehabilitation center attempted to establish a dialogue with the residents and change their attitudes. He invited the residents to meet some former mentally ill and tried to show them that these patients would not threaten their lives. No resident attended the meeting because at that time, the debate had already turned into a stalemate. Officials also proposed not to operate the center at its full capacity in the beginning, but to expand the services gradually. The aim was to allow the residents to adjust slowly to the presence of ex-mental patients in the neighborhood. When the residents saw that these patients did not alter their lives, officials hoped that they would accept the center. Unfortunately, these ideas either came too late or were implemented without any persistency.

The case shows that the choice of strategy to reconcile policy disputes was path-dependent. The initial decision on selecting a strategy determined what tactical options were available for the subsequent interactions between involved parties. Both parties started with exercising their power (voice and coercion) as their key strategy. The interplay of these strategies, however, created a situation of mutual distrust. When both sides believed that their opponents were not trustworthy and lacked the ability to listen and understand their standpoints, they could not image that any reasoned discussion would be possible. As discussed earlier, both parties also considered exit as a non-viable option. Hence, the only choice left for them was to continue to exercise their power to fight for their own interests. Under this circumstance, initiating any quality discourse became impossible.

AIDS Clinic in the Richland Garden

As the controversy over the rehabilitation center died down in 1995, a similar problem emerged in the following year. The government wanted to build a clinic near the Richland Gardens in Kowloon Bay (Figure 6-1).

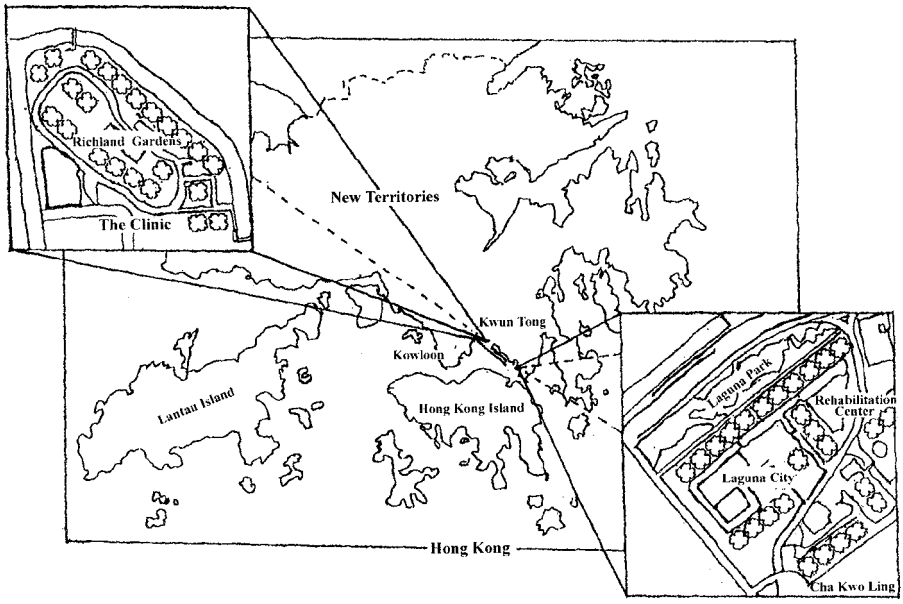


Figure 6-1 Location of Laguna City and Richland Gardens.

The original plan was to establish a general outpatient clinic. The project was later extended to cover: (1) a student health service center; (2) a day treatment center for skin and sexually transmitted diseases including HIV infection; (3) a radiography center; and (4) a nursing home for the elderly (Tam 1996a). The government planned to construct an 11-storey building with a total estimated budget of HK$168 million (equivalent to US$21.7 million).

Next to the selected site for the project was the Richland Gardens—a low-to-middle income neighborhood. Residents of the estate acquired their properties through the government's Home Ownership Scheme, which allowed them to buy their units at below market value. At that time, one condition for purchasing these properties at a concessionary price was that owners could not sell their units in the open market within the first ten years of occupancy. When the incident happened, most residents had lived there for only nine years; hence, the option of selling their properties and moving to another area was not viable.

When the residents found that the Health Department planned to build a clinic that would treat HIV carriers, they objected to the plan. There was a misconception about HIV carriers; many people thought that they were either drug addicts or prostitutes. The residents were afraid that the presence of these patients would affect the safety of the neighborhood and property values. They were angry because officials

changed the original land use that was designated for building a school without consulting them. Believing that the clinic would be too close to the estate, the residents demanded the government to move the building 250 meters away from the selected location (Ming Pao 1996).

Interplay of Strategies. Right from the beginning, the residents of the Richland Gardens committed the same mistake that the Laguna City residents made. They mentioned their concerns about the presence of HIV carriers in the neighborhood, and the government immediately called this discrimination against AIDS patients. A radio host and political commentator who followed the case closely said in our interview, "If from day one they charted a different course—talked about anything but AIDS—the government could have listened to them. But they did not. They went for AIDS and officials just laughed themselves silly. Because once you mentioned AIDS, it is discrimination. No politician and official will be on your side." The prejudgement that the residents were morally wrong impeded the chance for the two parties to discuss their problem peacefully. From the government's perspective, there was no need to reason with the immoral residents who discriminated against AIDS patients. Officials hastily eliminated the option of using persuasion as a strategy to settle the dispute.

The Chairperson of the Richland Gardens Clinic Concern Group (RGCCG) denied any AIDS discrimination publicly (Ming Pao 1996). He said that the residents did not oppose the establishment of an AIDS clinic in their neighborhood. Rather, they just wanted the government to respect their opinion on selecting the location for the facility. He claimed that the government ignored their request of moving the clinic farther away from the estate. Hence, they decided to fight against a decision made by a despotic government.

The spokesperson of RGCCG was unable to convince the public, and the government acted quickly to take advantage of the publicity. Its way of dealing with the protestors was to ignore their demand. The government moved the clinic 25 meters away from the estate and announced that it would not allow a further change (Chao 1996). In explaining why the residents' demand was not accepted, senior officials of the Health and Welfare Branch (HWB) stated that the residents' proposal could delay the project for twenty-four months. Because the government had already granted a contract to a company to construct the facility immediately, it would have to compensate the contractor $20,000 (US$2,584) a day for delaying the project (Lee 1996a). Feeling that they had strong moral and financial reasons not to alter their plan, the HWB officials did not see the need to negotiate with the residents. They decided to coerce the residents into accepting the clinic.

Failing to establish a dialogue with officials, the chairperson of the RGCCG sent letters to both the Governor and the Secretary of the HWB to demand a meeting. In their responding letters that I obtained from our interviewees, both the Governor and officials of the HWB repeated that the selection of the clinic site was correct. They asked the residents to cooperate with the government by allowing the construction to proceed peacefully. There was no indication in the letters that the government would

organize any discussion with the residents. This left the residents with only one option, which is voice, to handle their problem.

Stepping Up the Protests. In view of the government's indifferent attitude, the residents decided to turn to their politicians. Unlike the Laguna City case, both the Liberals and the Democrats stayed away from the issue. Only the Vice Chairman of the Democratic Alliance for the Betterment of Hong Kong (a pro-Beijing political party), Tam Yiu-Chung, and an Ex-LegCo Councillor of Kowloon East, Elsie Tu, supported the protestors. Both of them did not hold any political offices at that time, but planned to run for a seat in the LegCo in the future. They believed that the residents deserved a meeting with the government. Tu appealed to several government departments and the Governor, but failed to arrange a meeting for the residents (Tu 1996, 6). Unable to challenge the government through the formal political channel, the residents decided to intensify their public protests.

In addition to organizing rallies and signature campaigns in their own neighborhood, the protestors took a high-profile approach to attracting public attention. On April 29, 1996 (the first day that the government started the construction of the clinic), 300 protestors gathered outside the construction site and stopped workers from entering it. Twenty residents then went on a 24-hour hunger strike (Tam 1996b). The sit-in protest eventually escalated into tussles with the police. On May 24, the government sent in 120 police to seal the road between the Richland Gardens and the construction site to separate the angry residents from workers. Although the construction proceeded, there were still verbal confrontations between workers and protestors. On May 27, 40 residents—mostly women and elders—formed a chain outside the construction site to halt the work. The government had to call in the police again. After the arrival of the police, 200 more residents came to the site as reinforcement, chanting slogans and waving banners. When the police tried to dispense the crowd, they injured three elderly women (Lee 1996b, 3).

From then on, the residents treated the dispute over the location of the AIDS clinic as a battle against an authoritarian government. On June 16, hundreds of Richland Gardens residents marched in heavy rain at the city center (Szeto 1996). They tied a yellow ribbon to their arms and wore T-shirt bearing a slogan—"Democracy Dies, Bureaucracy Lives." In an interview, the convenor of the RGCCG recalled, "We wanted to fight to the very end. It was like 'June 4' (The date that a group of Chinese students demonstrated for democracy inside the Tiananmem Square in Beijing.)." The residents organized another march on July 28, and 400 people attended. They carried posters with slogans condemning the government's disrespect of public opinions. In front of the Kwun Tong Government Office, they burned a wreath to symbolize "the death of democracy" (Tang 1996; *Hong Kong Economic Times* 1996). At that point, the residents' protests shifted from the opposition against the AIDS clinic—a concrete landuse issue—to an ideological battle for democracy and justice. This tactical change made the situation even harder than before for the residents to establish a dialogue with the government. On the one hand, the residents were unwilling to yield to the government because they believed the protests were to fight for democracy. On the other hand, the

government stood strongly against the protestors because officials thought that they were fighting against AIDS discrimination. Both parties framed the issue differently and, therefore, found no common ground for a rational discourse.

Outcomes. Similar to the Laguna City incident, both parties lost in this controversy. Despite the time and efforts spent on resisting the government, residents of Richland Gardens still ended up living next to the clinic. For some protestors, the price was even higher because they were wounded during their rallies. According to our interviewees, one woman even claimed that her confrontation with the police led to a miscarriage. To make matters worse, the government and some Hong Kong citizens accused the residents of discriminating against HIV carriers. They were given neither the right to defend themselves against the accusation nor the chance to rectify the impairment done to their reputation.

For the government, it paid the contractor HK$500,000 (US$64,600) as the compensation for the delay of the project caused by the protests. It mobilized hundreds of police officers to keep angry protestors away from workers and the construction site. Despite spending all these public monies and resources, the government only earned the image of a despot. This was the very impression that Chris Patten (the last British Governor) wanted to change before the end of the British rule in Hong Kong. Yet, some Hong Kong people would remember this incident as a testimony of how their colonial ruler coerced the public into accepting its policy.

Like the Laguna City case, there was a moment when a discourse between the government and the residents could have happened. Had the parties focused on negotiating for the details of moving the AIDS clinic farther away from the estate, they might have settled their dispute without any confrontation. Yet, when the incident turned into an issue of AIDS discrimination and a fight for democracy, a reconcilable planning problem became unnecessarily complicated.

To some extent, the residents were forced to use voice after they had exhausted all avenues to arrange a meeting with officials. Getting no response from the government, they publicized the issue. When the incident became a fanfare, both the government and the protestors were unable to back off from their initial positions. This, in turn, undermined their willingness to listen to each other's arguments and solve the dispute through quality discourse.

CONCLUSION

It is time to return to the main question raised in this chapter: Is the communicative planning approach applicable to Hong Kong where democracy is not fully developed? Judging from the two case studies, the answer appears to be negative if the existing political and social institutions remain unchanged. The current political system of Hong Kong has created an unbalanced distribution of decision-making power between the government and the community. Government officials have the power to design and finalize public policy. Although there is always a period of public consultation, officials often take it as a formality rather than an opportunity to invite public

opinion. With no voting power to elect the Chief Executive of the government, the public has very limited ability to require officials to take public consultation seriously. This has established an institutional setting that discourages reflective thinking and consensus building—the two fundamental elements for practicing communicative planning. Under this context, parties involved in policy disputes can never image that quality discourse could be a viable option for solving their problems; hence, they will opt for the most commonly used strategies, which are voice and coercion. More important, tactical choices are path-dependent—meaning that once the conflicting parties decide to confront each other, their decisions and the interplay of their strategies generate the sentiment of mutual distrust and hostility against each other. This feeling towards one another eliminates the plausibility of peaceful conflict resolution through rational discourses.

The future application of the communicative planning approach relies primarily on the success of removing the current unbalanced power structure and devising new institutions that encourage parties to use persuasion to explicate policy quarrels. It requires a continuous effort to re-examine the existing institutional arrangements in Hong Kong, rediscover new ones, and remain receptive to new ideas. If the government and the public cannot do that, they will continue to use voice and coercion as strategies to settle their disagreements. In this case, Hong Kong will become a society where its people can only reconcile social conflicts through political manipulations and antagonism. To avoid this pessimistic outlook, there are, at least, four ways that the government and the public can do to reinvent the current institutional settings: (1) direct election of the Chief Executive of Hong Kong, (2) community empowerment, (3) mediation, and (4) education on reflectivity.

First, Hong Kong people should have the right to elect their Chief Executive. If the head of the government is democratically elected, other officials appointed by him will treat public opinions seriously if they want to run for re-election in the future. For officials, persuasion will become a more attractive strategy than coercion for dealing with public opposition. So long as one side is willing to restrain itself from exercising its power in the beginning of a conflict, persuasion will remain as an option for reconciling disagreement.

Second, democracy is not just about the assurance of citizens' right to elect their government officials, but it also relates to the greater collective control by people over their social and economic lives. This entails members' recognition of their social obligation to participate and manage their own public affairs. Put differently, a democratic system should also contain mechanisms of re-delegating social responsibilities back to its members. The re-delegation may reduce the public's reliance on government assistance, empower the community, nurture the spirit of self-determination, and, most important of all, reshape the asymmetric power relations in society. A more balanced power structure will make the choice of using either coercion or voice to settle conflict less attractive.

Third, the government and the public should establish rules for ensuring that all policy disputes will go through a mediation process. When a conflict emerges, in-

volved parties must hire an independent mediator to help them to negotiate with each other. It is similar to the common legal practice that parties involved in a lawsuit try to settle their disagreements through arbitration before they actually present the case to the court. The presence of an independent mediator may prevent the parties from reacting emotionally to the issue, manipulating the focus of the debate, or diverting their attention to secondary or ideological issues. All these actions and reactions, as learned from the case studies, could undermine the chance of using quality discourse to solve public policy dispute.

The government may establish a mediation fund and form an independent committee to oversee the distribution of funds to proper uses. The fund will assist parties who engage in a social dispute to hire professional mediators. To ensure their impartiality, these mediators will receive their fees directly from the Mediation Fund.

Fourth, and final, mediation will work only if involved parties can think reflectively. Education on reflectivity is, thus, indispensable. Many universities, especially graduate programs for business and law schools, have developed programs aimed at teaching skills of negotiation and mediation through the uses of cases, games, and simulations. The government can employ similar teaching methods to place officials and community organizers within a virtual policy arena, where various interest groups are in contention over a new policy initiative. Instructors will then coach the participants to reflect on: (1) why others object to their proposals, (2) what other and less controversial frameworks are available for them to define policy objective, and (3) how they can maintain continuous discourses with their adversaries under a contentious situation. I believe that changes are justified by what is at stake: the government and the public need to develop a capability for quality discourses so as to deal with policy conflicts arising from rapid democratization and urbanization in Hong Kong.

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CHAPTER 7

CENTRAL PLANNING AND MARKET ELEMENTS IN VIETNAM'S ECONOMY

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Reunified Vietnam in 1975 inherited two different economic systems. The roots of such difference were embedded by the French, who during their occupation prior to 1954, had developed two different strategies to exploit North and South. In the North, apart from rice and cotton, coal, ores and minerals were exploited both for internal industries and for export, and the transportation network was designed to carry the export products to the port of Haiphong. The South being a rice, coffee, rubber, and sugar producer, its products were either exported to France and the North using the newly established port of Saigon, which is now renamed Ho Chi Minh city, or processed in the Mekong Delta for local use.

> Thus, partition [1954] deprived South Vietnam, a food surplus area, of its domestic source of coal, paper, cement, textiles, and glass; North Vietnam, a food deficit area, lost access to the agricultural surpluses of South Vietnam (Harris et. al. 1962, 341 -342).

The Red River delta in the North had a much stronger and continued historical heritage of independence compared to the Mekong delta where peopling started only in the 18th century. By 1975 the North had lived under a communist regime for 20 years. In the Mekong delta and the South, capitalistic and feudalistic systems persisted until the mid-1970s. In the North wet rice cultivation predominated with livestock rearing of pigs and poultry, and the urban areas compared to the South had greater industrialization from the French colonial time. The South was primarily agricultural and its crops included rice, tea, rubber, sugar and coffee, while on the other hand, the North had been a mineral rich region. Such dichotomy continued through the mid 1990s:

> Hanoi, until the early 1 990s, ceased to add any impressive buildings since the beginning of the World War 11, and as a result the most noteworthy buildings were from the time of French colonial rule. The French era Hotel Metropole (Thong Nhat or Reunification) was the last really fashionable place in Hanoi. As the North Vietnam communists, during 1954-75, were too poor to be involved in "reunification struggle" and additional building constructions at the same time; they chose the struggle to reunify with the South (Dutt et al 1996, 208).

Rigid central economic planning, quite alien to market economy based countries, was the very basis of survival and advancement of the socialist countries. Thus, North Vietnam adhered to central planning immediately after its independence, while the South

had no central planning until the time it was reunified with the communist North in 1975.

HISTORICAL AND DEVELOPMENTAL BACKGROUND, 1954-1975

The Rationale for Central Planning

The circumstances under which the Democratic Republic of Vietnam (DRV), or the North Vietnamese Government, emerged in 1954 almost precluded development choices except for a centralized command system of the Soviet type. Internally, nearly a century under French colonial rule and a decade of bloody, armed anti-French struggle left the country extremely poor, underdeveloped, and split in two. Fresh from countless colonial rule atrocities such as, and most prominently, the 1945 famine that claimed millions of lives, the North Vietnamese leadership of the day looked to the Soviet experience. They knew very well Karl Marx's discourses on the limitations of small-scale peasant agriculture and artisan industry:

> This mode of production presupposes the fragmentation of holdings and the dispersal of other means of production as it excludes the concentration of these means of production, and it also excludes cooperation, division of labor within each separate process of production, and the social control and regulation of the forces of society (Selden 1993, 41).

Externally, post second world war notions, such as justice, equality, progress and national development, were often associated with the USSR and had a mesmerizing effect on the national liberation movement in Vietnam and many other countries. After gaining independence from foreign colonial powers the nations craved their own development. Many developing nations thought that the conditions for the Western European model of industrialization were no longer applicable, or even possible, and therefore the USSR's model of industrialization was a natural path to follow. One of the first countries to follow this model, in part, was India. In broad terms, this model presupposes concentration of power and resources in the State's hands to achieve rapid industrialization and drastic changes in the structure of the economy. At some point in the development process of the Soviet State, central planning and the administrative direction of the economy seemed to promise a pattern of development that would avoid the creation of private economic power benefiting mostly a few rich. Vietnam, during 1954-1975, followed the soviet model. As Harris puts it:

> the intellectual inheritance of the developing countries in the post-war period placed overwhelming emphasis on the role of the State. It is hardly surprising therefore that extreme forms of economic nationalism became almost universal among developing countries - imports control and substitution, overvalued exchange rates, large-scale public ownership and investment initiatives, directed investment with managed interest rates, prices and wages, and so forth (Harris 1992, 77).

The DRV Model

Fforde gives several general characteristics of the traditional central planning system in socialist countries: the central point in economic activity is the use of compulsion to extract economic resources and concentrate them in priority areas (Fforde and de Vylder 1996, 31). The typical transaction between economic agents, 'is not based upon the agents own calculations' of the relative advantages of alternatives between which they would then choose. Instead, transaction means the delivery and receipt of products in order to implement planners obligatory target. The key features of the DRV model has been:

> Management of the economy based on a comprehensive national plan and sectoral plans using material balance techniques ; Enterprises run by either state —through central ministries- or local governments. Agriculture collectivized. Production was considered a political task rather than a profit-making activity. Any losses could be covered; there should be no bankruptcy; All key prices (of all factor inputs as well as wholesale and retail price) and wages in state-owned enterprises set centrally and administratively; The state holds monopoly on foreign trade (Ljunggren 1993, 58).

In accordance with the main premise of central planning, land reform in the mid-1950s was patterned after China's land reform process. This ensured that there would be no land concentration and land loss. Land reform and nationalization of private businesses essentially erased the dominant classes, making Vietnamese society equal in many aspects. For the first several years of the Democratic Republic, perhaps until 1960, the central planning system aimed at the distribution of scarce commodities to those who needed them most. The plan was enforced and implemented by administrative orders and decrees (Fforde and de Vylder 1996, 57). To achieve the goal of creation of large-scale industrial production, a large central bureaucracy was created to allocate resources directly to the priority tasks of North Vietnam's national reconstruction.

Economic Achievements. The most prominent achievements of the system in economic development in this period were institutional capacity building, rough survey and inventory of national resources, relocation of tens of thousands of peasants from densely populated provinces in the Red River delta to the northern parts of the country, and creation of an initial industrial base with the help of the Socialist bloc including China. This involved a number of industrial projects ranging from a metallurgical complex, to a chemical complex, to a hydropower plant, to dozens of smaller plants and factories producing consumer goods. All were relatively small scale but rather impressive in the sense, that in the late 1950s and early 1960s Vietnam's allies were themselves grappling with problems of their own, and that the country's capital absorption capacity was low at the time.

Problems in DRV's Central Planning. Even at this early stage of development, central planning in Vietnam began revealing its inherent weaknesses. These include resource allocation imbalance, lack of incentives and unrealistic targets. For a large and well endowed economy like that of the USSR, resource misallocation and associated

structural problems took years to become recognizable, requiring restructuring or changes in industrial policy. For an economy as small as Vietnam's, even as industrial developments were largely financed by foreign aid, resource misallocation quickly resulted in increasing inflation rates in 1963 and 1964. This period of development was marred by the war to which every problem and failure was either rightly or wrongly attributed.

War Time Distress Mars Economic Development

North Vietnam decided to take on two forces: the South Vietnamese regime with about the same economic, military, and population potential as the North, and the American military with firepower many times superior to that of North Vietnam. Although the III Party Congress called for two simultaneous tasks -development of an industrialized state in the North and 'liberation' of the South, the latter soon became predominant as it was virtually impossible to conduct normal economic activity under heavy daily bombings and a large-scale investment of resources and manpower for the war. The slogan soon became: all the country is one front. Indeed, all of the existing and new industrial developments of the nascent economy as well as ports, bridges, and railroad were destroyed in the first days of American bombing of the North beginning in 1964. Important industrial sites and the transportation network were bombed repeatedly from 1964 to 1973. It can be argued that, even without American bombings, there was hardly a functional economy in the North in any real sense of the word. The fact is that both war and cumbersome central planning were equally responsible for the lack of development in Vietnam.

In this light, an insistence on explaining the poor performance of the Vietnamese economy as a typical centralized 'neo-Stalinist' system, which thus achieved little, is only a partial truth (Fforde and de Vylder 1996, 70). An earlier study (Fforde and Paine 1987, 127) did not downplay nor ignore the direct costs imposed by the war, but aimed at analyzing the economic model and its pure effects on the structural problems. Criticism of the shortcomings of central planning is more applicable to the next period, 1975-1986, than the earlier period. There was hardly any economic model in DRV because of war distortions.

The creation of an institutional framework modeled after the USSR and China took time, especially when there was an utter lack of experience and expertise among former guerrillas about how to run a state or an economy. Coordination and a working relationship between units, especially among central ministries, who operated plants and factories, and provinces, who possessed land and labor, had yet to be developed. Cadres were sent to study and learn from the experience of other socialist countries. A higher education system began effective operation only in the early 1960s.

In sum, the period 1954-1975 was a brutal wartime period that meant not only lost time, but also great destruction and had, in terms of progress and development, the effect of pushing the country tens of years back in the past. In response to war demand, a centralized, command system was created, or perhaps grew from the one that had existed before 1954. In the period 1954-1975, DRV was a typical but primitive centralized system of the Soviet type. This period can be described as a learning period for the

Vietnamese planning bureaucracy. Planning itself was largely formulated without facts, reflecting wishes and good will, rather than a reliable mechanism for mobilizing resources to achieve goals. In the absence of many basic instruments of planning such as an appropriate information system, and well-run chains of command and coordination, there was hardly any economic management activity in any real sense. The first Five Year Plan was not adopted until the 1960s. The plan's implementation came to an end in 1964 due to massive bombings. Wartime organizational experience and economic activity patterns were to be imposed on the next period of development.

SHORT-LIVED FULL FLEDGED CENTRAL PLANNING, 1975-1986

The defeat of the southern regime brought new hopes for development and a new momentum for central planning. From the leadership down to operatives, the victory was widely attributed to organizational capabilities and sound strategy of the Vietnam Workers party, and was believed to be a vindication of Marxist theory of the historic mission of socialism and communism as the next step of the human societal evolution. It was not realized that anti-war protests and movements in the U.S. motivated the Nixon Administration to make a deal with North Vietnam. Democratic centralism, or strong center model of political decision-making credited as the determinant factor in winning the war, was to be applied to socioeconomic development. Implicitly, it was accepted that the whole country would follow the development path that had been practiced in the North since 1954. More than that, according to the party's theorists, reunification also meant that the country had successfully accomplished the national democratic stage of the socialist revolution and it could then embark on the next, socialist stage. They insisted that, if on the earlier national democratic stage multiple forms of property and means of production ownership were allowed, there was no place for any ownership except state, or public, on reaching the socialist stage of development.

After unification in 1975, with a population of about 50 million (77 million in 1997) Vietnam, as one country, became a large market even by Asian standards. The country also possesses some potential in natural resources, although assessment widely varies among resource scientists. On a per capita basis and comparative perspective, however, a conservative description would rank the country as poor to moderate in terms of resource endowment. In the planners' vision, this large internal market should create substantial possibilities for development of diverse industry, as well as import substitution options. For the Northern planners who used to operate on much smaller scales, Southern Vietnam was a windfall: several hundreds of medium- to large-sized industrial estates, a relatively developed and well maintained infrastructure, a network of roads, bridges, ports and airports, and, above all, vast highly fertile land areas in the Mekong River Delta and in the central coastal plains. The relatively developed infrastructure in the South, although war-oriented, could be converted to civilian uses with minor investment and was mostly intact and poised to serve further economic development. In any scheme, the South's agricultural surplus and other potential such as greater

entrepreneurial tradition and better connection to foreign capital due to its prolonged exposure to capitalist markets even during wartime had a potential for great contribution to the industrialization strategy. Indeed, many reform measures were first experimented with or initiated in the South and then formalized by the government.

The IV Congress of the Vietnam Communist party in 1976 called for further prioritizing "socialist industrialization" as the main economic strategy, implying that investment would go primarily for creating productive capacities. To concentrate resources in the hands of the state, central ministries were created and added to the ones already in existence. On the other hand, at the IV Congress, provincial leaders also won more decision-making power and seats on the Central Committee, possibly resulting from their contributions to the war effort. The State Planning Committee remained a super-ministry who set national plans, five-year as well as an annual plan. Ministries and provinces set their plans in accordance with the national plan. To serve the objectives of large-scale socialist production, provinces were merged regardless of their differences, and small-scale administrative unit traditions that existed perhaps since the colonial time and even before. In the 1980s, the number of provinces was reduced to slightly more than forty to secure a simple and clear chain of command. The system of regional autonomous governments that existed before 1975 in the North and Central Highlands for mountainous tribes was eliminated.

The differences in economic structure between the North and the South were paid little attention to as the state determined to level these differences by imposing socialist economic management principles to the South, primarily by pushing collectivization of the Mekong Delta and nationalization (reform, in the official language) of private industrial and commercial businesses that were concentrated mostly in and around Saigon and mainly owned by the Vietnamese of Chinese origin. All were done without pondering possible consequences. Nationalization of businesses owned by the Chinese Vietnamese in the South, for instance, led to several consequences. Firstly, output decreased as the State could not run them as efficiently as private owners did. More than that, many inputs for these businesses came from Hong Kong and Taiwan, and outputs were exported back to these markets through a complicated system of transactions based on personal connections that ceased to exist with the change of owners. Secondly, a huge number of private businesses, even ones that were not to be nationalized, just stopped production and began hiding assets. Thirdly, it led to the exodus of the Chinese Vietnamese which, in turn, led to a loss of skilled labor in some sectors and worsening the relationship between China and Vietnam. Earlier, during 1975-77, the government had experienced resistance to collectivization from southern farmers many of whom, unlike the Chinese-Vietnamese, wholeheartedly supported the VietCong during the war.

International Environment

Policy-making in Vietnam had always been a balancing act between two intertwining factors, foreign influence and a yearning for sovereignty. The influence of the international environment on Vietnam's development trajectory was felt in full in the year 1978. In that year, Vietnam joined COMECON and signed a cooperation treaty

with the USSR. Also in 1978, Vietnam-U.S. negotiations on normalization of relationship was close to a successful conclusion which could have opened ways for the U.S. to participate in after-war rehabilitation and reconstruction and release of an aid package (estimated at about 3 billions of U.S. dollars) committed by Americans as part of the Paris Agreement in 1973. Moreover, the reported relentless attacks by the Khmer Rouge on southern Vietnamese provinces bordering with Cambodia resulted in thousands of innocent civilian lives being lost. Also, the Pol Pot Khmer regime aligned itself with China. All these required a "decisive response" from Vietnam, which in early 1979, helped get rid of the Pol Pot regime. This military involvement was protested by the Carter administration by imposing an economic embargo on Vietnam, meaning an end to foreign capital inflows, needed for the country's modernization. Angered by the exodus of the Chinese-Vietnamese and prodded by the fall of the Khmer Rouge, a close ally, China waged a war along Sino-Vietnamese border in February, 1979. That war was short, less than a month, but it brought about a great deal of destruction to six Vietnamese provinces and dislocated several hundreds of thousands of people. More importantly, conflict with China and Cambodia drained huge resources that could have been used in development.

A hostile international environment and the reduced flow of aid created resource constraints in the economy. The economic embargo tended to have less effect on an economy like Vietnam's as it might have had on others because the country had hitherto never relied on aid from the West in any significant scale. Also, as a consequence of prolonged wars, the Vietnamese economy became very dependent on aid from the Soviet bloc countries and China. This aid, though, as noted previously, not sufficient to put the economy in a new orbit or to bring about an economic restructuring, was important because the economy was also small, and there were times when the whole planning machine operated on aid distribution. Further, there was an urgent need of foreign aid and capital to help boost income and living conditions for the population.

The crisis-driven reforms

With reduced aid and new military mobilization, the Vietnamese economy reached a new low point in 1979 and 1980. Indeed, this reduction in foreign aid, and complete aid elimination from China, led to a fall in price inputs. The situation was aggravated by the fact that since reunification in 1975, and especially after nationalization in 1978, the state was committed to provide subsidized inputs. Producers became reluctant to sell their products to the state at low procurement prices. To avoid procurement, peasants, particularly in the South, reduced production, kept hoarding, or sold on free markets. By the same token, capacity utilization in state-owned enterprises plunged as workers were idled waiting for input supplies from the state network. Many targets set by the IV Congress turned out to be unrealistic and unachievable because they were based on the assumption that costly investment would continue to be supported by foreign aid. Rice production, for instance, was only around 14 million tons in 1980 as opposed to a target of 20 million tons for that year. Cabinet reshuffles became frequent as the leadership

looked for ways out of difficulties. By all accounts, the economy was on the brink of a crisis. As a consequence, reforms that would stimulate economic efficiency were introduced. The reforms in 1979, unlike in 1986, were indeed initiated at the top, though not without pressure from below.

Reform measures were introduced first in agriculture in 1979, as a result of several factors. First, Vietnam was an agrarian society with peasants comprising around 80 percent of the population. Although the party emphasized the role of the urban working class in national liberation and socialist transformation, the system actually rode on the submissiveness of northern and central peasantry. Only the state sector workers were provided with regular wage, retirement, and other benefits. Providing the peasantry with some relief seemed both necessary and reasonable. Second, by this time, the leadership realized that, without costly investment, industrialization efforts were stalled.

The V Party Congress in 1982 decided to reorient the development strategy and invest more in agriculture and light industries as a way to accumulate surpluses to finance industrialization. Thus a "contract" system was initiated, setting clear quotas at the beginning of each cropping season, and allowing farmers to sell on free markets any output in excess of the allocated quota. This was a modest reform measure, but the response was positive. More significant, this was the beginning of the end of the cooperative system. The Chinese rural reforms had begun a year earlier, but the Vietnamese claimed that their rural reforms were not modeled after China.

In the state sector, "fence-breaking' activities (operations outside the official plans) by State-Owned Enterprises (SOE), were legalized by the "three-plan system." Plan A was the state plan under which the enterprises were provided with the inputs at subsidized prices and were required to turn in products to the state. Under Plan B, after fulfilling Plan A, a SOE could use the left-over from the subsidized inputs, or obtain inputs from other SOES, to produce extra output that could be sold on the market. Under Plan C, also after fulfilling Plan A, SOEs could be engaged in producing anything except illegal goods. Although these reform measures were of piecemeal nature and were resorted to on a survival basis, they showed how the state micromanagement and pricing system had limited managers and workers' initiative and incentives.

There were also some negative effects stressed by some to discredit reform. New unacceptable inequalities in the society had been created. Moreover, households with more manpower were likely to gain, and those that lost male member(s) to the war would gain nothing from the "contract' system. In the state sector, the "three plans " benefited only those SOEs who produced consumer goods. Not every worker on these SOEs benefited equally because there were no stipulations as to how to share the profits earned under plans B and C. The three plan system inevitably channeled scarce resources to black markets making them scarcer and damaging other programs and projects, especially the ones with social orientation. This mainly involved managers and planners with access to resources. This was the beginning of corruption that would later permeate the state sector and, eventually, the society as a whole. Employees in other sectors such as civil service, education, healthcare and servicemen got no share at all from these reforms.

By the early 1980s, though, as the USSR stepped in as a major aid donor, the economy showed signs of positive growth, though small for a developing country with high population growth rates. This restored confidence in central planning among the top echelons (Fforde and de Vylder 1996, 101-123; Riedel and Corner 1997, 191-192). Naturally, aid was distributed by the planning machine headed by the State Planning Commission and related ministries. This time, unlike the l950s and 1960s, the Soviets wanted to concentrate on certain projects. The aid, estimated at around $800 million annually during most of the 1980s, therefore went again mainly to creating productive capacities such as electric power plants, oil exploration, building factories, and machine-building complexes. These projects took time to build and their effect on the economy was not to be felt until the late 1980s. In addition, building these and other industrial capacities required significant contributions from the Vietnamese side as well, leaving agriculture and other sectors with little investment, thus accelerating inflation, foreign trade deficits, and government budget deficits.

At the end of 1985 the government decided to solve these problems by introducing the "price-wage-money" reform. In a nutshell, the price component meant legalizing the system of dual prices on factor inputs and the means of production, the state prices and free market prices (before this, only the state, through ministries and provincial governments, had the right to possess and transact productive means and inputs), and elimination of subsidized packages for state sector workers. The wage reform, consequently, aimed at raising wages/salaries for the state sector employees to offset the lost subsidies. The money reform explicitly aimed at reducing the large amount of paper money in circulation, which was not supported by productivity and/or output growth; but its implicit goal was to expropriate the money assets of individuals getting rich by illegal activities. This was a typical administrative measure that ignored economic laws and market rules. It had the effect of spiraling the already high inflation rate, 500 percent for the next year of 1986. More seriously, the entire system began losing credibility as many ordinary people saw their lifetime savings evaporate overnight. The richer, who, as a rule, kept their assets in foreign currencies or immobile assets got richer. Elimination of state subsidies meant that a) one should organize one's life without reference to the state, and b) Vietnam in 1986, was faced again with another crisis situation which even the leadership, who were very sensitive to the masses' dwindling support, acknowledged as a serious socioeconomic crisis (Ljunggren 1997, 493).

Grounds Laid For Future Reforms

Contrary to the Vietnamese leadership's vision and to the dismay of the much-suffering population, the period from 1975 to late 1980s became even more tumultuous and dramatic than the previous three decades of wars. In wars, goals and means were simpler: the objective was to achieve the goal of driving out the enemy, the people's unconditional support was secured. The last decade of the Cold War turned out to be very unfortunate for Vietnam.

The two biggest problems of the centralized planning system in Vietnam, that surfaced in the previous period, 1954-1976, the resource misallocation and lack of

incentives were revealed again in full in this period. While resource misallocation could be somehow justified by a variety of reasons, such as political, security, and social stability considerations, resource use inefficiency plagued socialist economies as the scarce capital was reinvested into production capacities or projects that turned out to be very low in competitiveness or unusable at all in a market economy.

The 1979-1986 period, nevertheless, helped lay a basis for further reform measures. Even the party's hard-liners felt that allowing farmers and workers to decide what to produce, and to exchange some part of their output outside the state distribution system meant no harm. The fact that output responded positively each time a measure of state intervention was removed helped to build pressure for reform both from bottom and from within.

THE WORKING OF MARKET ELEMENTS IN REFORMING SOCIALISM: 1986-1999

One of the important characteristics of the Vietnamese reform process in the period since 1986 is that spontaneous initiatives in contravention of prevailing regulations have tended to lead government policy changes to accommodate changes that have already occurred (Rana and Naved 1996, 206). In this sense, the reform process in Vietnam was in many respects a bottom-up movement. The VI Party Congress at the end of 1986 decided to follow this lead. Several simultaneous developments, internal as well as external, prodded this new direction. The external events include, most notably, the landmark *perestroika* policy in the former Soviet Union, the success of reforms in China, and the success of neighboring market economies, such as South Korea, Taiwan, Malaysia, and even Thailand.

Internally, the price-wage-money reform in 1985, although a failure as it started a period of hyperinflation, represents a point of no return to old times, because it had partially eliminated the state price control system, the crucial element of the traditional central planning system. Unlike the "contract" system in agriculture in 1979 and the "three-plan system" in the state sector in 1981-1982 that were basically a passive response to exigencies to legitimize what was already happening at the grassroots level, the price-wage-money reform of 1985 was a well-designed scheme coordinating the effort of many thousands of bureaucrats from several ministries. This reform in many respects resembled Poland's 'shock therapy' measures in 1989 and Russia' similar measures in early 1991. Its experience as well as its consequences would serve as a valuable lesson for future reforms. It would also save political capital for the next generation of leaders when they took on more drastic reform measures.

Several reform measures took place between 1979 and 1986 which, in other circumstances, could be considered as serious deviation from the official line. Ideologically the old leadership was still very much committed to orthodox Marxism. Positive results of the first reform were not emphasized. Those reform measures were, therefore, halfway and the leadership tended to back away from them if there appeared signs that

the state management was losing the ground. At the VI Party Congress in 1986 a new leadership emerged who found it easier to accept free market elements or even a market economy in a fuller version in so far as the party's dominant power was not challenged. More importantly, the reforms under a new leadership would obtain more credibility and support, both from domestic and international circles, than under the old guard. In the aftermath of contentions and compromises at the VI Congress, there emerged the so called "renovation" policy. Indeed, internal party politics has often resulted in new policies and personnel and been revealed in full in the run-ups to and during each party's Congress (Fforde 1997; Ljunggren 1993). In retrospect, it was more a call for change rather than a set of coherent reform policy. But then, as many students of reform movement in socialist societies note, there is an apparent shortage in theories on transition from central planning to a market economy. Even countries such as China, Hungary, and the USSR, who clearly possessed great intellectual capacities to explore a solid theoretical basis for a comprehensive, smooth transition and who started the reforms much earlier than Vietnam, had largely been following a trial-and-error approach rather than resorting to a sophisticated strategy of transition. In the end, reform is a learning process and no single reform sequence will fit all the transitional economies (Ljunggren 1993, 48). A need exists for developing a comprehensive longer-term approach to reform, with capacity and institution building as central elements.

The Reform Components

The lack of a well elaborated reform strategy reflects the fact that, in 1987 and 1988 as the government groped for key reform elements, the economy continued deteriorating with inflation remaining high and fiscal standing worsening (Riedel and Corner 1997, 195). On the other hand, a lot of ground work has been laid, by demobilizing about half a million servicemen, downsizing the bureaucracy by merging central ministries and reducing the number of civil servants on both central and local government levels, and improving Vietnam's international standing by withdrawal from Cambodia. A number of important laws, decrees, and by--laws were promulgated. They provided domestic and foreign businesses with a relatively stable legal framework.

By 1989 the government was poised to remove major remnants of the central planning system in several crucial realms. First, the dual-price system (or, the state price system) was eliminated. From then on, the market determined all prices and there were no low-price inputs for SOEs anymore. Second, the state monopoly on foreign trade was removed and replaced by foreign trade organizations. Big SOEs and provinces were allowed to conduct export/import operations directly with their overseas counterparts. By liberalizing the exchange rate and using import duties instead of quotas, the government virtually put the Ministry of Foreign Trade on the same competitive basis as other trading companies. Third, farmer cooperatives, already in a very loose setup despite recurrent attempts to collectivize, practically ceased to exist in the South. In the North, though, they still operated in some form until 1993 when the Law on Land allowing long-term land lease was enacted. Also in 1989 the government, for the first time, successfully used interest rates to beat inflation. All this meant that planners could

withdraw from direct control over individual economic agents and transactions and concentrate instead on leverages of management such as interest rates, public finance, and strategic issues like macroeconomic stabilization, long-term development priorities, income distribution, and coordination of regional development.

One of the important reform developments is the creation of industrial groups and state corporations beginning around 1993. Each group or corporation consisted of one or several SOEs and many more smaller SOEs producing similar products. Groups and corporations operate independently from ministries and provinces as well, although their boards of directors are appointed by the state in consultation with corresponding ministries. Many observers believed that that was a preparatory step for privatization of SOEs and a way to form and accumulate capital, the South Korean style. Stripped of production management functions, ministries then concentrated on the "state management" function which, in the Vietnamese usage, meant strategic and long-term planning, writing and enforcing by-laws, and other related activities such as research and consulting.

As it had happened before, output response to eliminating barriers was again positive. This time the difference was that the positive output response was to be maintained for many years. This time, because the reform touched all sectors and industries, growth occurred everywhere from agriculture to foreign trade to service sector. Whereas in 1988 there had been a severe shortage of food staples in some regions, in 1989, the country became self-sufficient in food stuffs and even exported more than one million tons. Rice exports stabilized around two million tons per annum depending on the world market. Foreign trade, including both exports and imports, expanded at an annual rate of 25 percent from 1989 to 1993 and more than 30 percent from 1994 to 1997. Another sector experiencing dramatic growth and that significantly contributed to GDP growth was foreign direct investment. As of 1997, the government had approved 1,814 foreign-invested projects with total capital of $30 billion (though realized amount was only $6 billion, or 20 percent). In general, average annual GDP growth rate for 1991-1997 was about 8.5 per cent (Riedel and Corner 1997, 20).

Successful Reforms Lead to High Growth Rates

To identify and assess the underlying factors accounting for high growth rates of the Vietnamese economy during 1989-1998 is crucial. Western observers tend to explain the improved performance of the Vietnamese economy in this period mainly by noting two factors. First, a majority naturally attribute successes to the reforms and market forces, and to the removal of central planning barriers such as price control and state intervention in economic activity that had earlier led to disincentives and resource misallocation and inefficiency. Second, they tend to explain the success of the reforms by stressing the agrarian and subsistence nature of the Vietnamese economy, where it was easier to adapt to restructuring in transition than in the highly industrialized and state-monopolized economies of Eastern Europe and the former USSR. Indeed, with all the privileges in obtaining credit and investment, the state sector in Vietnam produced less than 40 percent of GDP and the state sector's share of total labor force was a

diminutive 8 percent even in the heyday of central planning. The state sector's share of Vietnam GNP in 1990 was only about 24 percent (Rana and Hamid 1996,146).

Obviously, these two factors are among the most important ones. But apparently they do not entirely account for high growth rates. These explanations also have weaknesses. For example, the planning bureaucracy, although reduced in number, remained and continued allocative functions. It helped provide, paradoxically enough, a stable environment for transition which even Western scholars now recognized as a crucial condition for successful reforms. As for the private sector in Vietnam at present, as several authors correctly note, it needs time and more equal treatment to grow from small-scale survival-based family economy into a real market force. Further, there is little evidence to support the assertion that the smoothness of transition is determined by the low level of development. Quite on the contrary, reform difficulties in Bulgaria and Romania were considered at the lower end in COMECON and relative successes in Hungary and Czechoslovakia were considered faster. This shows that the reverse may well be true. There will be no rapid and consistently radical transformation in the other spheres, while the key features of the old classic structure, the Communist party power remains (Ljunggren 1993, 44). Economic efficiency and party monopoly cannot exist together and state ownership means that there will be no effective ownership which is still the case of Vietnam and China (Ibid. 92). The two countries nevertheless are doing relatively better than those in the USSR and Eastern Europe who disbanded such monopoly to promote efficiency.

These two factors may well become the most important factors of growth in the near future when Vietnam exhausts other growth potentials. Other factors remain largely under researched. For one, since the late 1980s Vietnam, for the first time in many years, perhaps for the first time in the history of the republic, has been experiencing a more or less normal international environment. This factor is indeed most important because it accounts for the two fastest growing sectors in the Vietnamese economy since 1989, foreign trade and foreign direct investment. Foreign-invested projects, for instance, currently account for 30 percent of Vietnam's GDP and 20 per cent of total export turnover, and they remain its fastest growing contributor. Economic embargo, one of the major distortions prohibiting Vietnam from utilizing its comparative advantages as a low-wage economy to attract foreign capital was still there and was not lifted until 1994. It had been grossly ignored by Vietnam's most important trading partners since the promulgation of the reforms in 1986.

Further, in a cross-sectional perspective, the 1980s are generally considered a lost decade for all developing nations, except for the Newly Industrialized Countries (NICs) and some other ASEAN economies. Thus, the crisis situation in Vietnam's economy in the mid-1980s may have several confounding factors, both domestic economic policy and general structural changes in the world's economy. How much each factor contributed to the poor performance of the economy in the 1980s also remains largely under researched.

Another factor of steady growth, which may be less important but should not be missed, is that by the late 1980s the industrial projects in which Vietnam had invested

heavily during the decade, electric power, oil extraction, shipyard and cement, began giving returns and the country actually did not have to invest in infrastructure on the same scale during the last ten years. Another positive dimension of this factor is that local cadres and workers obtained skills and experience on big project management. As the economy is growing, this factor may be fading, but it shows the importance of timely investment in costly, but necessary, infrastructure projects and the leading role of government in such activity even in a market economy.

Further, the national income (net material product) statistics of the early 1980s do not suggest a crisis (Perkins 1993, 2). Since the announcement of reform, and even before, the performance of Vietnam's economy has not vindicated the reforms (Riedel and Corner 1997, 192-194). Indeed those numbers show an average GDP growth rate of 6.3% for 1981-1986 as opposed to 8.2% for 1990-1997.

SETTING GOALS FOR 2020 AND BEYOND

Vietnam has moved from a situation where reforms tended to be crisis-driven, to one where the authorities are beginning to develop a long-term vision of directions for the country to follow (Fforde 1997, 23). Where is Vietnam heading? What kind of society will it be? What role will it play in the Southeast Asian region in the future? These are popular themes for discussion not only among Vietnamese scholars, but also for interested international observers, and there is no shortage in prescriptions and scenarios. The fact that Vietnam has not renounced its socialist orientation and the dominant role of the Vietnamese Communist Party (VCP) and, apparently, is not going to do so in the foreseeable future, makes the theme more unpredictable and intriguing.

Lingering Problems

Many difficult decisions have not been tackled during more than a decade of transition (Fforde 1997, 177). They include reform of SOEs, the ownership right, the relationship between party and the state, and the market environment facing farmers. Rapid growth, especially in the rural areas, to some extent occurred despite the absence of answers to these major questions. This showed, on the one hand, the fundamental strengths of the Vietnamese economy. On the other hand, there were signs of slowing down in the economy in 1996-1997. Slowing down actually occurred in 1998, with GDP growth rate estimated at 5 per cent, but the main reason was generally believed to be the financial crisis in the region.

Further the authorities needed a sound strategy for long-term growth and this strategy could be the one adopted by successful neighbors, and one that was "tailor-made" for Vietnam (Reidel and Corner 1997, 212). In Taiwan in 1986, for example, there were over 57,000 private manufacturing firms employing a total of 2.3 million people. In Vietnam in 1995, there were only 1,776 private manufacturing firms of a comparable size, employing just over 100,000 people. Given that Vietnam's population is about four times larger than Taiwan's, it is hard not to conclude that the potential of

private enterprise has been kept locked up. What needs to be done is to liberalize regulations to allow the private sector to flourish. Indeed, the private sector's potential in Vietnam is huge and foreign investors including the International Monetary Fund (IMF), the World Bank (WB), and the Asian Development Bank (ADB) are more than willing to invest for the growth of the economy. Tran Van Hoa (1997, 19), while avoiding to directly name privatization as a precondition for success, stresses the importance of public administration reforms and of a master plan for industrialization and modernization of the national economy for different sectors and regions which must be elaborated and coordinated. A similar plan in the form of a roadmap for economic reforms also must be elaborated and implemented.

Ljunggren (1997, 492), while pointing to the needs for political reform, the rule of law (legal reforms), and development of social structures as the basis of civil society, predicts a model of soft authoritarianism, which is the pattern followed by South Korea and Taiwan, and some other successful ASEAN economies such as Malaysia and Singapore. Lubeck (1992, 178) provides more discussions on the concept of the Asian authoritarian state. Given the nature of political culture in Vietnam and the reasonableness of the East Asian model for the country, he allows that economic success in the long run would undermine authoritarianism. In other words, if authoritarianism worked for East Asian and ASEAN countries, it should also work for Vietnam.

Thus, Western studies on the country typically revolve around issues such as privatization of the state-owned enterprises, private ownership rights, the relationship between party and state, and, above all, the problem of the rule of law as the determinants of economic growth. These studies clearly bear ideological undertones, and, as such, have only limited significance. On the other hand, at the current stage of development when other possibilities for growth have been exhausted, they may well be the only option to choose from. By all accounts, the ownership problem in agriculture and SOEs will be tackled first. The government, however, is likely to behave very cautiously on this front for several reasons. With regard to private ownership of land, for instance, some authors recognize that, in the context of poor endowment in land and, as a result, the small land holding nature of agriculture, the emergence of a land market might very soon lead to a disastrous scenario, if bad harvest occurs and farmers are forced to sell land (Fforde and de Vyler 1996, 261). Likewise complete failures in the Russian SOE privatization program tend to keep the Vietnamese government from any drastic efforts in this sphere for a while. In fact, the government still wants SOEs to be "the backbone of the economy," even as they have had trouble offering much beyond steady jobs. More than that, only 300 SOEs of the total of 6,000 made profits and contributed to state coffers in 1997. As many as half lost money. While in 1990 SOE tax contribution represented almost 60 percent of government revenues, in 1996 they accounted for just 41 percent.

Yet, while some of SOEs may lose money and need state subsidies, their tax contributions are a stable source for social programs. Further, the state can more easily control their bookkeeping than that of the private sector. This is important for Vietnam where the taxation system is primitive, weakly enforced, and corruption is widely preva-

lent. As the state is still very much in control of large foreign-assisted development projects, SOEs still get resources and bank credit through joint ventures with foreign capital. As of 1998, over 95 percent of all joint-ventures are made with state≤-owned companies. For Vietnam, the most appropriate strategy for tackling ownership problems is to closely watch and analyze the Chinese experience in this direction before taking on these thorny issues.

Setting Long-Term Goals

Vietnam's socialist leadership has set a goal for Vietnam to industrialize in 20-25 years. Specifically, Vietnam aims to achieve the level of today's East Asian economies. There are two questions here: How realistic is this goal? Why is the East Asian model of development valuable for Vietnam?

First, the transformation of the East Asian economies represents a particular experience for Vietnam which has many similar characteristics. These include cultural heritage, large population potential, relatively poor per capita endowment in natural resources, and favorable geographical location. Vietnam's initial point of industrialization also resembles that of East Asian countries when they embarked on modernization in the 1960s, namely low economic growth rates, high population growth rate, high inflation rates.

Second, this model can be characterized by an extensive government intervention to guide development and the market. In the past decade, in the face of the success of East Asian economies, South Korea, Taiwan, Singapore, and lately, Malaysia and Thailand, a number of western scholars began stressing the notion of and the role for a developmental state, rather than the pluralistic state model opined by themselves in the late 1970s and 1980s as a precondition for modernization. From an economic point of view, Koo and Kim (1992, 121) define two characteristics of a developmental state. First, is its autonomy from societal forces. Its economic bureaucracy can devise long-term economic policies without interference from private interests. Second, is its capacity to implement economic policies effectively. The state can exercise a large measure of control over the domestic and foreign capital. A weak developmental state is what Vietnam has been, especially in the period 1975, until recently, and it has to strive for both these characteristics. On the surface the government in Vietnam appears to control key levers of state power such as the army, the currency, the bureaucracy, and the budget. At the same time, it lacks mechanisms to create a favorable economic environment such as stable rules of the game, an appropriate legal framework, and defense of property rights. Thus, Vietnam lags far behind South Korea and Taiwan of the 1960s and 1970s on these points.

Third, newly industrialized Asian countries are actually the only economies that besides high growth rates, have also experience and contemporary evidence in other regions (World Bank 1993, 29). This softens the traditional image of the market as ruthless and unequal and fits the vision of the "conservative" wing within the Vietnamese leadership. Further, the East Asian export-oriented industrialization model also suggests the state's active participation to promote exports and to protect domestic infant

industries. This also fits the traditional perception of the role of the state among the leadership and the people.

Fourth, East Asian economic experience is valuable for Vietnam by its diversity and flexibility. These economies offer both the conglomerate model centered around *chaebols* in South Korea and family-centered firms favored in Taiwan. In Vietnam, the creation of big industrial corporations and groups represents the first preparation step in adopting East Asian development strategy as an effective way of capital formation and accumulation. At present, these corporations are still state-owned, but they no longer belong or report to the central ministries. It is widely believed that when the circumstances are "ripe", these groups and corporations will be privatized and will work like South Korean *chaebols.* In the meantime, the government has come to realize that the importance and the dynamics of family-owned businesses helped, among other things, to absorb excess labor force from the downsizing state sector and military demobilization during the late 1980s and early 1990s, and thus helped to actually abate many social problems associated with transition. Furthermore, it has been found that in Taiwan, Singapore and elsewhere, stimulating the private sector stimulates efficient allocation, even among SOEs. Clearly the SOEs will have to improve their performance in order to be competitive in the private sector.

Evaluation of National Plans

National Planning started with graet emphasis on economic centralization.This was a true reflection of the then-Communist party policy, which further hardened until 1975. Since 1975, the capitalist-feudal based South Vietnam economy needed a stage of transition and therefore, the Second Five-Year Plan (1976-80) had to make some adjustments, resulting in more balance between centralized and market economies. After the initial transition phase in the South, the economic centralization processes reverted back. Since the end of the 1980's general liberalization and market-economy based on productivity trends became a part of the political system in Vietnam. Like China, Vietnam has embarked on a policy of increasing levels of privatization and market-economy without much disturbing the political and governance practices. Socialist government structure, one-party system and controlled freedom of expression at the political level on the one hand and privatization of economy on the other, is the dichotomous arrangement with which the Vietnamese government is experimenting.

Short-Term Tactics and Maneuvering: The Planners' View

At an operational level, the Vietnamese planners tend to count chips rather than resort to variables that are hard to quantify. Besides the country's natural endowments and constraints, human capital, and institutional and organizational constraints, an optimistic observer may wish to point to Vietnam's advantages as a late industrializer. On the other hand, disadvantages are still numerous and some of them are no less daunting than the ones Vietnam had faced before reforms. As noted previously, foreign trade and foreign direct investment (FDI) have been the major driving forces of high economic growth rates during the last ten years and the economy still possesses vast potential for

these two sectors. Given this, it is only natural that the Vietnamese authorities will continue to work toward nurturing a favorable environment for international trade and capital inflows.

Advantages. For later industrializers, advantages include technology transfer and free flow of capital. Recently discovered new technology is more efficient in terms of productivity, resource energy saving, and environmental protection. Technology transfer requires the availability of a well-trained workforce. Although under the central planning regime Vietnam had been investing considerably in basic education, it does not necessarily mean that its workforce can absorb any high technology production processes. In addition, Vietnam's intellectual force had been built up to serve the ideals of socialism and, as a result, people with skills suited to a commercialized economy, such as accountants, managers, lawyers, commercial bankers, economists, marketing professionals, were sorely lacking. It is, therefore, important for the country to continue to invest in training, healthcare and education, in general and higher studies in particular (Fforde and de Vylder 1996, 259).

Further, to lure FDI requires a willingness to get involved in the region and be an integral part of the world economy. For foreign investors, transparency, predictability, and stability in the host country's law and regulations are extremely important. In some Vietnam circles, however, notions such as foreign investment still bear a connotation of exploitation and loss of sovereignty. This explains why the authorities often change foreign investment regulations including the Foreign Investment Law, which makes international investors jittery. For all practical purposes, the leadership has come to an increasing realization that free flow of capital, information, ideas, and products have the potential of eroding national identity and characteristics. Especially sensitive to this are small developing economies including Vietnam who rely decisively on foreign capital for modernization. Vietnam simply cannot realize its growth potential unless it becomes a part of the globalized economic system, and therefore, the apprehension such as loss of 'national identity' must be combated.

Disadvantages fostered by Lack of Aid. Unlike other countries in the region, Vietnam is likely to face severe limitations in foreign aid, both from official development aid (ODA) sources and from international financial organizations such as the IMF, the World Bank, the ADB, and others. For several reasons and practical purposes, the process of economic policy liberalization and deregulation in Vietnam has been managed in almost complete absence of financial (ODA) from the main donor countries and major multilateral institutions. For the period 1986-1990, for instance, Vietnam received $0.7 billion, or around $140 million a year not including the Eastern block's aid, while the Philippines and Thailand received $4.7 and 3 billions, respectively. On a per capita basis, OAD to Vietnam was considerably lower. The low level of aid, perhaps one of the lowest in terms of both per capita and absolute value among developing countries, will make it harder for Vietnam to achieve the goals of quick modernization. Although the situation has improved somewhat since the early 1990s, Vietnam probably will not be

ranked high in the priority borrower list of major donors. The relations with the IMF, the World Bank and the ADB remain strained, especially in terms of privatization and private ownership.

Vietnam also will not be able to enjoy other advantages that South Korea, Taiwan and other regional economies have capitalized on from the 1960s until the late 1980s such as, the benefits of military supplies, fewer trade barriers, lax intellectual property policies and so forth. Other problems such as membership in the World Trade Organization will probably take years to work out. In sum, Vietnam faces a development environment less favorable than any other ASEAN and NICs countries did during their high growth period. This fact is not only a matter of timing, but also of the nature of the system in Vietnam.Vietnam needs to evolve its own way of development in this age of globalized economy.

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CHAPTER 8

RECENT PLANNING STRATEGIES IN JERUSALEM

ELISHA EFRAT AND ALLEN G. NOBLE

Central to the successful resolution of the peace process in the Middle East is the disposition of the city of Jerusalem. In an earlier study (Efrat and Noble 1988), parts of which are referred here, we attempted to analyze the factors that affected the decisions of planners on both sides of the issue. Now, almost a decade and a half later, a re-examination of the planning issues surrounding the question of the disposition of the city seems warranted.

Few cities evoke such strong emotional response from so many people as does Jerusalem. Sacred to at least three major religions, Jerusalem has long been a source and a scene of contention among the adherents of these faiths and their political sponsors. During the past half century, each of the three religions, represented by a Christian, a Jewish, and an Islamic polity, has attempted to determine the orientation of development in the city. Each effort has had only limited success.

At the same time, the demographic balance in the city has changed. The annual increase in the Jewish population was about half that of the Arab, and the ratio of 73.3 percent Jews to 26.7 percent Arabs in 1967 shifted to 58 percent Jews and 32 percent Arabs in 1999. This trend has persisted since 1969, and figures have accelerated with the government-assisted move of Jerusalem residents to nearby towns beyond the 'Green Line.'

Since 1948 Jerusalem has been discussed in terms of a threefold division: the Old City, East Jerusalem, and West Jerusalem (Figure 8-1). The Old City comprises five areas: the Armenian quarter, the Christian quarter, the Jewish quarter, the Moslem quarter, and the Temple Mount, which, depending on religious orientation, is also known as Mount Moriah, Dome of the Rock, or Harim el-Sharif. The Old City is conveniently and precisely defined by its impressive encircling walls, built during the reign of the Turkish sultan Suleiman the Magnificent early in the sixteenth century.

East Jerusalem usually refers to the parts of the city outside the walls of the Old City that were under Jordanian rule between 1948 and 1967. The population of East Jerusalem is mostly Arab. Mount Scopus, which lies northeast of the Old City, never was under Jordanian control and hence is considered to be an outlier of West Jerusalem, the third component. It includes not only the areas generally to the west of the Old City but also Mount Zion, immediately adjacent to the Old City on its southern flank. West Jerusalem has been under Israeli control since 1948 and the population is predominately Jewish.

The uneven topography of the Jerusalem region profoundly affects settlement

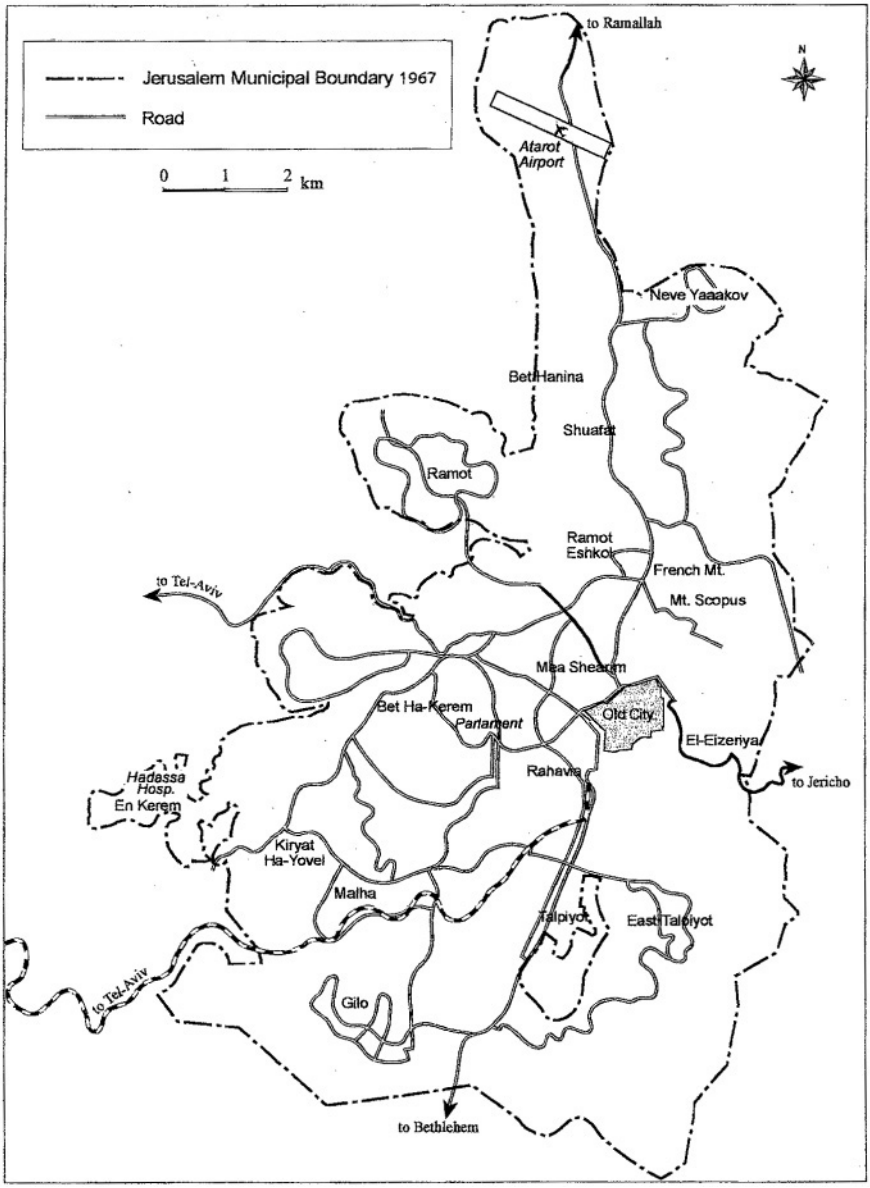


Figure 8-1 Municipal Boundaries of Jerusalem, 1967 - 2000

and growth patterns of the city. Hillocks and isolated interfluves alternate with winding valleys and scattered basins. These lower-lying areas originally were used for agriculture and for access, and on the steeper slopes were wastelands, forested parks, cemeteries, and public open spaces. The high elevations became the locations of residential neighborhoods and independent villages that were subsequently absorbed by the expanding city. Thus a mosaic of residential clusters separated by agricultural, open, or institutional zones emerged as the standard pattern of settlement in late-twentieth century Jerusalem. The rapid expansion of both Jewish and Arab populations has further complicated the situation.

GROWTH OF RESIDENTIAL NEIGHBORHOODS

The long-established neighborhoods beyond the Old City developed through years of accretion. Instead of displaying the conventions of modern city planning, they often reflect the personalities of their founders and original inhabitants who generally had a common origin and who formed a close-knit social group. In contrast with the modern practice of neighborhoods or towns planned by central-governmental authority that are settled with heterogeneous inhabitants who must undergo social reeducation to adapt to new surroundings and neighbors, these old communities began with residents of relatively similar background, experience, and orientation. Settlements of this type were associated with each major religion.

More than thirty such residential neighborhoods had emerged in Jerusalem prior to World War II. The Jewish settlements were mostly west of the Old City. Sectarian support for land purchases by Christian groups antedated even World War I. For example, the Russian compound developed as a center for pilgrims from Russia, and the Germans built a similarly nationalistic colony in a distinctive architectural style. These places served the dual purposes of providing permanent residences and offering support to pilgrims.

A further impetus to the proliferation of distinctive residential neighborhoods emerged solely in the Jewish community. Jews often refrain from mixing with their neighbors, a tradition that reflected centuries of discrimination in widely scattered areas. Hassidic Jews were so extreme in their communal segregation that they isolated themselves even from other Jewish groups.

Most Jews who arrived after 1918 were not as bound by the conservative religious traditions, and conflict and tension soon arose between orthodox and liberal groups. With continued population growth, crowding and congestion in the Jewish settlements eventually led to the planning and the erection of neighborhoods in Western architectural styles prevalent in the 1920s and 1930s. However, the established neighborhoods were largely unaffected by the new trends. Gradually long-term residents who were less bound by conservative religious interpretations migrated into the westerly parts of the city, and the buildings thus vacated in the old quarters were taken over by the expanding

orthodox Jewish communities.

The neighborhoods of East Jerusalem are more likely than ones elsewhere to be outgrowths of independent villages that coalesced. These neighborhoods tend to be traditional in orientation and unpatterned in layout. With other parts of the Muslim world they shared rigid ideas about neighborhood form and housing to ensure maximum privacy of women and to deflect casual traffic from private spaces. Such strongly held ideas and notions counterbalanced or neutralized many planning efforts and regulations proposed by the various central governments.

Recent Arab and Jewish Construction and Settlement

An accelerated Arab construction in East Jerusalem has implications for the future development of Jerusalem. Arab construction had spatial and political implications, involving the occupation of considerable territory by a relatively small population, control of important roads connecting Jerusalem with its environs, the placing of obstacles between sites of Jewish development, and the creation of difficulties in providing services.

In regard to the Jewish areas of settlement in the region, many Jewish settlements were erected. The townlet of Givat Ze'er, for instance, had in 1998 about 9,700 inhabitants. East of Jerusalem is the town of Maale Edummim, being rapidly populated and absorbed. It had up to 1998, about 22,200 inhabitants. The Jewish expansion over the region was designed to ensure control of access to Jerusalem, there being no desire to return to the pre-1967 situation, when Jerusalem was a cul-de-sac, virtually cut off from its environs (Figure 8-2).

The Arab-Jewish struggle for the Jerusalem area has had a demographic aspect as well. At the end of 1998 Jerusalem had about 633,700 inhabitants. The Jews numbered 433,600 and the non-Jews 200,100. Furthermore, the Jewish population of the city is aging, while the Arab population is becoming younger.

Without a declared war, the artificial fabric of unity was torn by demographic, geographical and political realities. Although Jerusalem earlier had been decreed a reunified city, it returned now to its former status as a divided city, sundering along the so-called 'Green Line.' The Israeli illusion of a Greater Jerusalem and a reunified city for the two peoples vanished, probably forever.

UNIFICATION AND PARTITION PLANS

It may be useful here to review briefly the various earlier plans which have been proposed to address the problem of civic administration for Jerusalem. Shortly after the conclusion of the Six-Day war in 1967, Israeli annexation of East Jerusalem and the Old City brought Jerusalem under a single political control. For security reasons, military officials and politicians, not planners, made hasty decisions about the exact location of new boundaries of the reunified city. Two goals guided those decisions: military

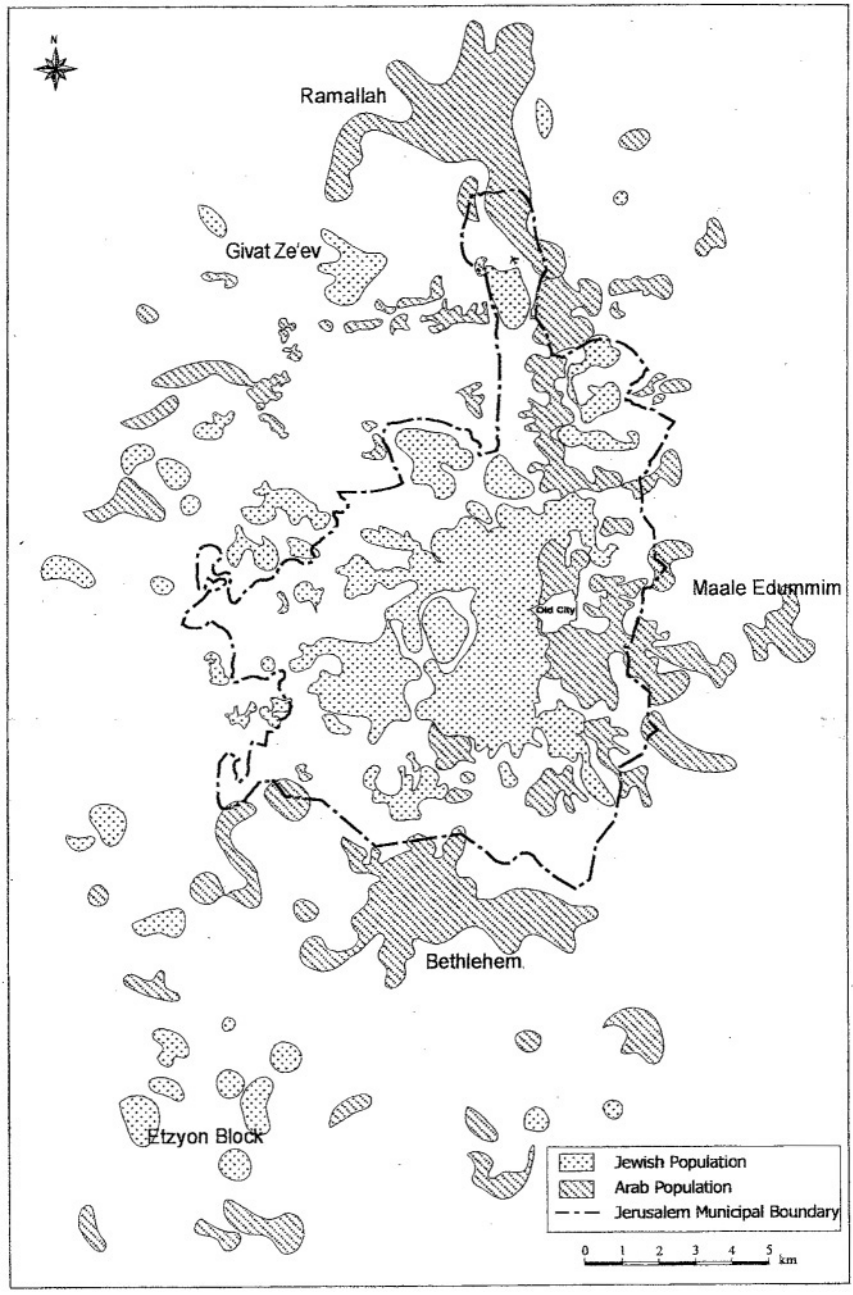


Figure 8-2 Jewish and Arab Population in Jerusalem and its Surroundings.

considerations, especially the inclusion of heights to facilitate defense, and a desire to maximize the amount of territory but to minimize the size of the Arab population. Difficulties of achieving the latter were reflected in the fact that between 60,000 and 70,000 Arabs were included in the united city that was approximately three times larger in area than the exclusively Jewish pre-1967 portion controlled by Israel.

The new municipal boundary was drawn to include all the uninhabited no-man's-land and to incorporate the strategically important areas of Mount Scopus on the northeast and the Mount of Evil Consent and other heights on the south so that a defensible perimeter existed in case of future conflict. The boundary was extended considerably to the north along the Ramallah road to encompass the airport, another militarily important site (Figure 8-3). The altered status of the city, its exposed position, its enlarged size, the presence of a large minority group, and continued objection from the United Nations to unilateral Israeli control was the new context that planners faced.

Partition Plans of Jerusalem after the 1967 Six-Day War

A proposal was prepared on July1968 by an advisor on East Jerusalem affairs to create a unified zone for the areas within the sphere of influence of metropolitan Jerusalem, and to serve as a proper framework for the city's development; establishment of independent municipal units within the framework of the extended municipal area, with due attention to the types of settlement it contains, and to the desire of the minorities for self-government in East Jerusalem. This was an attempt to meet the Arab request for controlling part of Jerusalem while ensuring Israeli sovereignty over territory within the city's current boundaries. The means were delimiting municipal boundaries which would include territories under Israeli and Jordanian sovereignty; establishing a joint umbrella-council for five boroughs: Jewish Jerusalem, Arab Jerusalem, the villages, Bethlehem and Beit Jalla; granting limited autonomy to the Arab Jerusalem borough and villages sector, with some of the villages to be under Jordanian sovereignty (Efrat 2000).

In December 1969 a proposal was put forward by William Rogers, who was at the time Secretary of State of the U.S., at the height of the War of Attrition between Israel and Egypt along the Suez Canal, following the Six-Day War. Roger's plan for resolving the Arab-Israeli conflict was rejected by both Egypt and Israel. One of the reasons for Israel's negative reaction was that the plan itself did not specify that Jerusalem would remain under Israeli rule. The proposal's main points were: (1) the United States cannot accept unilateral actions by any party to decide the final status of the city; (2) the final status can be determined only through the agreement of the parties concerned, primarily Jordan and Israel, taking into account the interests of other countries in the area and the international community; (3) Jerusalem should remain unified; and (4) there should be open access to the unified city for persons of all faiths and nationalities. The plan did not refer specifically to the holy places, but did cite the need to ensure free access to the city and to take into account the interests of all its inhabitants and of the Jewish, Islamic and Christian communities in the city's administration.

A proposal was published in winter 1991/1992 by C. Calbin, M. Amirav and H. Siniora (1991-92) within the framework of a research project conducted by the Truman

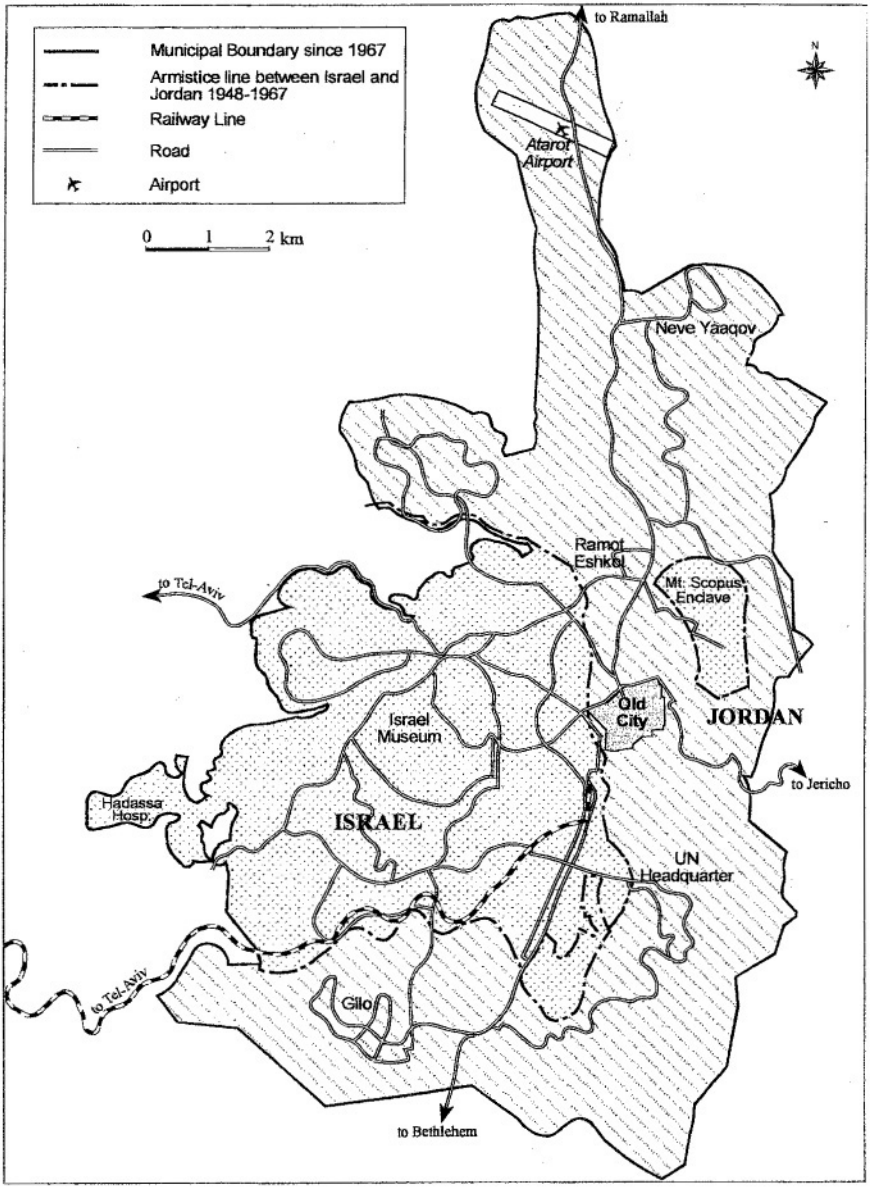


Figure 8-3 Area of Jerusalem after Unification.

Institute to analyze a number of key issues involving the resolution of the Arab-Israeli and Palestinian-Israeli conflict. In that proposal it was written that the area of the city would be quadrupled by adding an almost equal amount of territory from Israel and the West Bank. The new metropolis would include Ramallah in the north, Mevasseret Zion in the west, Bethlehem in the south, and Maale Edummin in the east. With the new boundaries Jerusalem would have a population of some 800,000, almost equally divided between Jews and Arabs; the population balance would be maintained in the future by means of an immigration policy based on an annual increase of no more than three percent; Metropolitan Jerusalem would be divided into twenty municipalities; the government of Israel and the Palestinian state would still handle most matters normally vested in national authorities; the two States would maintain jurisdiction to adjudicate the metropolis; the citizenship of residents of Jerusalem would be determined by their own wishes rather than by the area of the city in which they happened to live; Metropolitan Jerusalem would be a single, physically open area with no checkpoints or physical barriers; the Old City would form its own municipality and be run by a city council; decisions regarding physical planning and development must be approved unanimously by the members of the city; and each faith would have full administrative power over its holy sites.

Recent Partition Plans of Jerusalem

On October 1995 three maps, which were prepared by the Jerusalem Institute for Israel Studies, describing alternative plans for the ultimate solution in Jerusalem, were passed by government officials to the Palestinian authority. In one of these maps the recognition of Palestinian sovereignty in East Jerusalem was clearly expressed, but with it also the annexation of some wide areas to Jerusalem and Israel, as the Etzyon Bloc, Maale Edummim, Givat Ze'ev and Betar.

A second plan proposed by the same institute took for granted the existing situation in the city which has been created since the Six-Day War, based on the assumption that according to it, the municipal area of Jerusalem will remain under Israeli sovereignty. Changing areas by a mutual agreement between Israel and the Palestinians, because of pragmatic and municipal reasons, will be possible as, for instance, improvement of security posts, or the improvement of territorial links for Jewish and Arab population in their neighborhoods.

A third plan is based also on the assumption that Israel will get exclusive sovereignty in Jerusalem in its present municipal boundaries. In the framework of a mutual agreement exchanging of limited areas with those in Judea, might be possible. A symbolic center of sovereignty for the Palestinians in the city might be approved. The Temple Mount will be under super-sovereignty of Israel and under Palestinian-Islamic-Jordanian administration; a similar status will be given to the Church of the Sepulcher, and to the Christian Quarter in the Old City; the Armenian Quarter will get a special status, and as would the space between the walls and near to the surroundings of the Old City.

The aim of this plan is to administer functional autonomy under Israeli sover-

eignty in all the quarters in East Jerusalem. Such an autonomy will be supervised by the Jerusalem municipality and will include, among others, the following domains: collecting domestic taxes, administration of borough councils with permanent staff-members, culture, education, sport, social services, gardening, health and religious services.

The idea of functional autonomy already has been accepted in principle by different institutions and organizations which are involved in Jerusalem's political future. The idea which lies behind it is to convey some important authority to borough administrations, to develop in them domestic security with civil guard, and to encourage their independence as against the municipal administration. Borough administration should be established in all the parts of the city. In such a framework it will be possible to create a sub-municipality for the Old City with an inter-religious and international council.

In this plan it is also recommended that the existing system of borough administration should be dispersed to all the other neighborhoods in the city. The administration in the Old City should be established on the ethnic and religious composition of the inhabitants. The boundaries of each borough should be delineated by consultation with the inhabitants' representatives who reside in the area.

Functional autonomy to the boroughs may have a good chance to be accepted. The present situation that exists in the city is undesirable and not acceptable to the Palestinians, while recognition of Palestinian sovereignty in East Jerusalem is not agreeable to many of the Israelis. This plan is flexible and enables different kinds of arrangements between the two communities.

PLANNING FOR POLITICAL NEGOTIATIONS

For the negotiations which were held in Camp David in September 2000, the Jerusalem Institute for Israel Studies prepared a series of plans, as a basis for a final agreement to be reached between the Israelis and the Palestinians regarding the future situation in Jerusalem. The plans included three alternatives for a territorial solution in the town from Israel's viewpoint, but taking into account different proposals for sharing Israeli and Arab sovereignty (Figure 8-4).

The first plan described a situation in which Jerusalem would remain, more or less, in its current municipal boundaries under Israel's sovereignty. The access between the Israeli and the Palestinian sides of the town would remain open and free for all people as in the current status quo. This alternative was mostly a continuation of the existing situation at that time, but was expected to be unacceptable to the Palestinians.

A second plan proposed that Jerusalem would still remain under Israel's sovereignty, but with a possible exchange of small areas along the borderline with Judea and Samaria, a region that is now under Palestinian authority. A symbolic sovereign capital center would be established for the Palestinians in Jerusalem to run their administration. The Dome of the Rock and the holy sites on the Temple Mount would be under Israel's sovereignty, but under Islamic, Jordanian and Palestinian administration. A

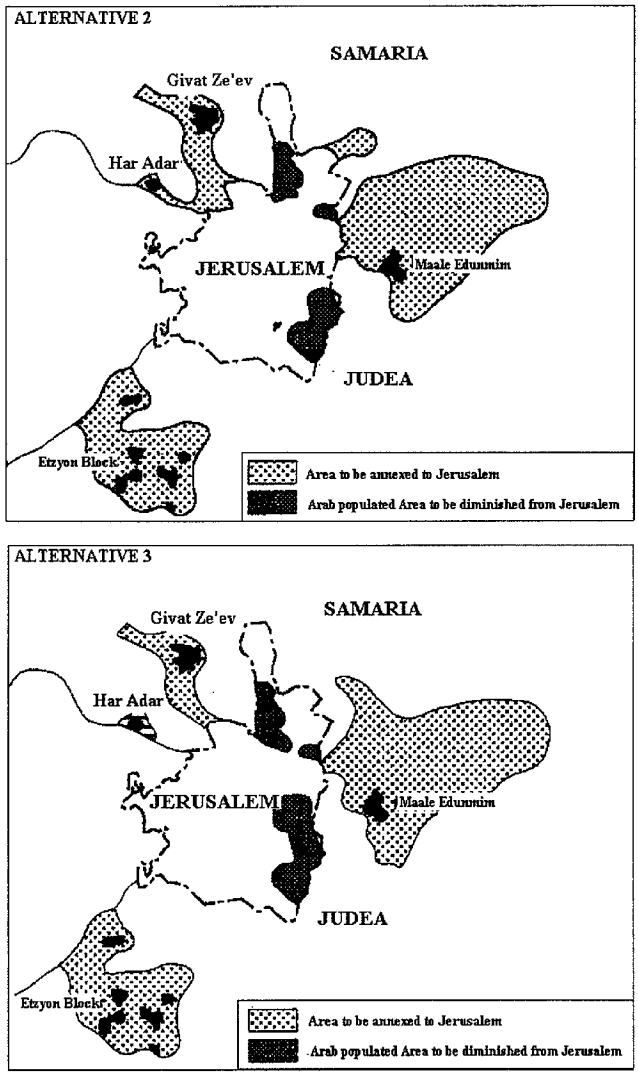


Figure 8-4 Alternatives for Partition of Jerusalem and its Environs: Dotted areas are to be annexed by Jerusalem. For alternatives 1 (not shown here) and 2 areas indicate Arab populated areas to be diminished.

special status will be given to the Old City, including free access to the holy sites between the walls for all religions.

A third plan proposed the partition of Jerusalem into two capitals, with Palestinian sovereignty in East Jerusalem and Israel's on the western side. Even according to this plan the town would remain without inner physical barriers. Following this alternative a supreme municipality could be established with two municipal branches, one for each side, which will enable them to deal together with common problems in one place, and with particular problems of each side, in the others.

These three maps and plans were submitted to the Israel governmental authorities as a basis for their decision making towards the negotiations, in order to reach an agreement with a compromise as a possible solution.

PLANNING JERUSALEM AT THE BEGINNING OF 2000

Jerusalem has not yet prepared an official and approved outline scheme. Meanwhile, many partial and local town plans are prepared and approved from time to time by the municipality council, which very often needs changes because of political and demographic events in the area.

In the framework of the preparation of a new master plan, the municipality is interested to enlarge its jurisdictional area to the west, and to annex some parts of the Jerusalem District in order to get more space for another 75,000 dwelling units, industrial zones and employment centers for its growing population (Figure 8-5). The intention is, for instance, to change the small village of Tzur Hadassah into a town, to establish the new townlet Bat Harim, with 30,000 dwelling units, to extend the suburb of Mevasseret Zion, to add housing plots in some villages of the Judean Mountains, as in En Hemed and Bet Neqofa which lie west of the city, and to convert agricultural land into building areas. Other projects include the construction of a new main ring road in the east and west of Jerusalem, the establishment of new neighborhood centers in many parts of the town, more institutions, commerce centers and other needed facilities.

The municipality is also interested to integrate all the partial plans and projects into an urban fabric, so that toward the year 2020 about 60 percent of the Jewish population and 40 percent of the Arabs will be able to conduct their life peacefully in Jerusalem. Whether such peace can be achieved is problematic and will depend upon larger issues to be solved outside of Jerusalem.

Acknowledgements

Maps were drawn by Orna Zafir-Reuven.

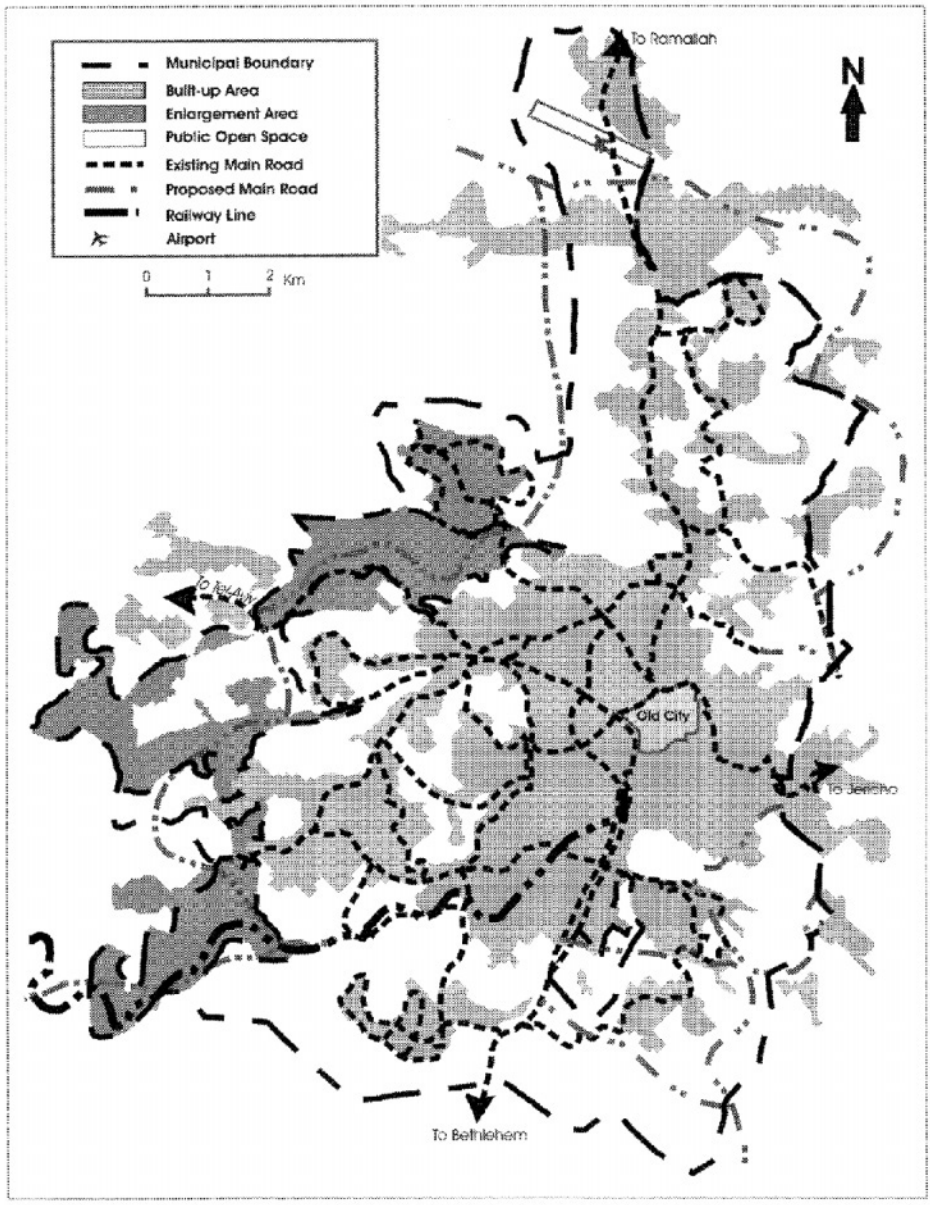


Figure 8-5 Enlarged Areas and New Roads in the New Jerusalem Master Plan.

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CHAPTER 9

A SPATIO-TEMPORAL, FUNCTIONAL CLASSIFICATION OF INDIAN CITIES

GEORGE POMEROY

General connections between urbanization and changing sectoral labor allocations, which are well established by past research, are relevant to understanding how societies develop. While schools of thought may differ in trying to explain how or why this occurs, none can deny that these connections exist.

Research by Clark, Fisher and Kuznets a half-century ago (Oberoi 1978; Pandit and Casetti, 1989) seemed to demonstrate a nearly law-like relationship in how changes in sectoral labor allocations occurred through time. This early research, based on the experience of more developed countries, indicated that changes in sectoral allocations between the primary, secondary, and tertiary sectors followed a very predictable fashion. More recent research (Moir 1976; Pandit and Casetti 1989; Mills and Becker 1986) shows that the evolution of labor allocations in developing countries is distinctive from that in developed countries. Generalizations can be made about the developing country experience, too. However, variations in the general relationship are common and are too often discarded as "noise" in the modeled relationships (Pandit and Casetti 1989, 331).

In India, as in many other countries of the developing world, economic growth and change has long been recognized as bringing momentous change, particularly in regard to the function and structure of urban centers and urban systems. India is typical of many developing countries in that it had a long and pervasive colonial history and today possesses a sectoral labor allocation profile that is similar to many other developing nations. Less common, yet characteristic of India, is the stability in the economic system, which has experienced slow, yet steady growth and remarkably little sectoral change among urban workers when the totals are aggregated at the national level.

In this chapter, functional classification and analysis of sectoral shifts are used to evaluate ("test") modernization theory in terms of what is predicted about sectoral labor allocations and their relationship to urbanization, and then perhaps to offer a refinement of theory. Like a number of "new modernization studies" (So 1990, 62) this chapter applies historical analysis of one particular case, India, and gives greater attention to external factors (first, colonialism and very recently, economic liberalization) which have been important in the development process.

THE CASE OF INDIA

Clearly then, the general relationships between the economic development process and sectoral shifts in employment, whether across space (geography), time (history), and scale (city size) are known. It is important that given how India varies from the generalized relationship and given its weight in terms of demographics and economic potential, that the contextual variation of development and sectoral shifts be further explored.

In studying the transformation of the occupational structure of urban India, the inquiry is necessarily inductive and grounded in the data. Grounded research is interpretive and is best defined as letting the data speak for themselves, given the "methodological frameworks" (Morse 1994). It is proper that an inductive approach be mentioned at the outset, as it leaves open or allows for a widened scope of inquiry in terms of the research questions posed.

At the most general level, several questions can be asked. First, how well can sector shifts (as indicated by labor allocations) signify movement along the development continuum? Second, are there spatial patterns in the sectoral transition occurring within India during the 20th century? These general questions lend themselves to the inductive research methodologies noted above.

More specific questions also can be asked. Are there stages of colonization and sectoral allocation? If so, do these stages of colonialism reveal themselves in the spatial pattern of sectoral shifts over time? If so, can these be modeled? Berry, quoting his work of twenty-some years earlier, states "each new stage of urban growth will act independently of prior stages if it is based upon innovations that give rise to structural transformations" (1996, 681). If one modifies this statement by substituting "innovations" with "new political economic relationships" (i.e., achievement of independence), then perhaps functional classification can capture the dynamic of development within the context of political-economy. This then may be a refinement upon modernization theory.

As a result of both an indigenous and colonial legacy, the urban system in India lacks a "certain heartland" and has several urban hierarchies based on the cities of Mumbai, Calcutta, Delhi, and Chennai (Berry 1972, 55). Dutt and Das (1993, 130) state that "one of the reasons for this may be that India was not a politically unified nation-state until she became independent in 1947" and "there have been several cities that functioned as centers of national administration, economic and cultural activities at different time periods." Do such urban hierarchies become evident through the use of functional classification?

Finally, some research questions can be asked about the appropriateness and usefulness of a functional classification. These questions do not demand a set of operational hypotheses, but do demand discussion. Is a multiple-method functional classification useful in undertaking an explicitly spatial and temporal assessment of India's development progress? Is this same methodology successful in evaluating the applicability of development theory in a developing country? Which aspects of functional

classification - univariate or multivariate - best serve the researcher? For this research, what are the advantages and disadvantages of each method of classification given above? Is it possible to develop a synthetic or indexed method that may improve classification? Can multiple techniques, taken together, achieve an analysis in which the "whole is greater than the sum of the parts," so to speak?

EMPLOYMENT IN CLASS I CITIES, 1901-1991

The data set that is used for this analysis consists of total city population and employment by major sector for class I cities in India (those of 100,000 population and greater) for all census years 1901-1991, with the exception of 1941 when a more limited census was held due to wartime considerations. Employment and population data up to and including 1971 is for males only. However, these same data have been used in other analyses (Mills and Becker 1986) and are the best available. As with Mills and Becker's World Bank Research Report (1986), the source for the data is Mitra, Mukherji, and Bose (1980). Both Mitra and Bose have had direct access to census materials - both published and unpublished. Data for 1991 have been obtained separately. Census statistics for Class I cities for 1981 are not available due to changes in census administration during that census. The data sets chosen for this analysis are remarkable in that they cover a long period of time for a large number of places.

Cities through time have been classified into various size classes by the census based on overall populations that have remained constant through all census periods (Bose 1978, 77). Class I cities are those greater than 100,000 persons. In the past, the spatial data of the city for which census data are collected corresponded quite closely with the built-up area of the respective urban place. Bose (1989, 111) notes though, that some areas are "overbounded" and others "underbounded". For example, Greater Bombay, in terms of the collected statistical data, encompasses many outlying areas which are relatively built-up. Calcutta, on the other hand, is underbounded as a number of adjoining legal cities such as Howrah and Dum Dum are considered separately for statistical purposes. This metropolitanization is, of course, common to many countries and has long posed a spatial bounding problem for geographers everywhere.

Data for this study are obtained from 10 census periods and the number of Class I cities for each period of course varies with the urban growth that has generally occurred and the occasional decline in population in certain urban centers. These cities have represented an increasing share of the overall population and of the total urban population.

Employment classifications fall into several categories, with slight alterations in the categories and additional categories through time. Within the primary sector are three groups of occupations, two of which are agriculture related. Cultivators are self employed agriculturalists who rent or own their own land, whereas agricultural laborers are hired out as laborers only. Mining involves the extraction and processing of miner-

als for industrial usage, or the extraction of sand, gravel, and stone for local construction usage. Fishing, is categorized only for the 1991 census and can be either marine or freshwater focused.

Secondary activities include manufacturing, household industries, and construction. The former two were considered together prior to 1961. Manufacturing involves the assembly and fabrication of goods, using modern methods, for capital or consumer purposes. The category household industries is comprised of traditional activities, such as pottery, jewelry making, and carving, as well as silk weaving, cotton weaving and even bidi (cigarette) making. These activities comprise of different specializations based on local culture traditions, availability of resources, and marketing possibilities. Construction denotes building activities.

Tertiary sector activities are categorized as "other services", trade and commerce, and transportation. Employment in other services is often related to governmental, educational (university-level), pilgrimage and nodal activity and is especially prominent in administrative centers. Trade and commerce includes banking, financial activities. Transportation is employment working for the railroads, trucking, and shipping, whether it be in shipping and receiving or in the actual movement of the goods.

METHODOLOGY

The literature reveals a plethora of methodologies may be employed in undertaking a functional classification of cities, with some of these individual classification techniques better suited to particular purposes. Univariate techniques, for example, are more closely associated to the "categories of everyday experience". Multivariate techniques, on the other hand, have other advantages, such as allowing the typologies to emerge from the data set (Davies and Donoghue 1993, 1170-1).

Certain classification techniques are appropriate for different research questions. A number of techniques are employed here, several of which are descriptive and others which are inferential. Although the primary methodological tool will be functional classification, it can be undertaken in a number of ways. Six particular methods are applied in this case. Briefly, these methods are: 1) the use of statistically defined thresholds (arithmetic mean, standard deviations) following Nelson; 2) the use of a "diversity index" which measures the degree to which employment may be concentrated into one or several sectors for a city; 3) the application of regression analysis to occupational data to examine how certain urban functions are related across space; 4) the application of factor analysis to capture the underlying elements of occupational structure and location; and 5) cluster analysis to ascertain groups of cities that share a high degree of similarity across several variables. In addition, local qualitative information (6) supplements and enriches the quantitative analysis. Taken together we may better uncover the functional roles cities play and their spatial dimensions. Each of these six tools is

elaborated upon in the discussion below, with some qualitative analysis being infused into each subsequent evaluation.

Nelson's Method

This single-variable classification method is best identified with Nelson's, "A Service Classification of American Cities" (1955), hence the term "Nelson's Method". For each employment category of each year, descriptive measures of central tendency (mean percentage) and dispersion (standard deviation) are calculated. For each city, standardized scores (z-scores) are calculated to indicate how far above or below the mean the city falls in terms of standard deviations. This is done for each occupational sector for each year. Those cities having employment greater than one positive standard deviation, that is z-scores greater than one, in each respective employment category are then displayed cartographically. These cities are considered moderately specialized in the economic activity being studied. Those cities which have scores two, three, or more standard deviations above the mean are noted and indicate, respectively, high, very high, and extremely high degrees of specialization.

Simple Linear Regression

Typically, simple linear regression is applied to ascertain the strength and direction of relationship between one or more independent (or predictor) variables and a single dependent (or criterion) variable. In this case, however, regression analysis allows one to compare the general relationship between two variables, in terms of the regression equation, and to relate how that relationship may vary across space. The relationship between these two variables is not necessarily causative. The relationships between variables which are highly correlated (positively or negatively) lead us to expect certain spatial patterns. When spatially displayed by mapping regression residuals, we may see where these relationships do and do not fit expectations. Where the relationship does not hold true we may guess that certain other functional dynamics are at work - this is when valuable insight may be gained.

Factor Analysis

A variable reduction technique, factor analysis is often applied to examine for "underlying dimensions" (Kleinbaum, Kupper and Muller 1988, 596). Several variables taken together may best represent some underlying dimension not fully captured by any single variable. These, termed either factors or components, may be calculated for each case (or city in this instance) and then mapped. These calculated values, known as factor scores, are determined by the weighted sums of the values of the standardized variables. The standardization of factor scores eases analysis of their distribution about the mean. Mapped standardized factor scores may reveal patterns of multi-variate specialization. When mapped over several time frames, changing regionalizations may become evident. An application of factor analysis in the functional classification of Indian cities allows a geographical understanding of what underlying dimensions are important in particular regions of the country.

Cluster Analysis

Cluster analysis, also known as Q-analysis, is a multi-variate statistical technique often employed in research questions "best resolved by defining groups of homogenous objects, whether they be individuals, firms, products, or even behaviors" (Hair et al 1995, 421). Cluster analysis is unique among multivariate techniques for two reasons. First, its focus is the comparison of objects themselves and not the variate (Hair et al 1995, 423). Second, it is not a statistical inference technique from which conclusions about whether an object is representative of a population are made. Instead, it is used to quantify "the structural characteristics of a set of observations" (Hair et al 1995, 435).

The particular analytical method employed is hierarchical cluster analysis, where each case starts out as its own cluster and through aggregation larger groups of clusters are formed in subsequent stages. The clusters are combined via Ward's Method, which is biased toward the production of clusters with similar numbers of cases.

In this case, cluster analysis is applied to determine which cities are most similar to each other in terms of employment characteristics in a given census year. Cities within each cluster should have more in common with one another than with cities outside the cluster. The cluster analysis is performed for each census year studied and the stability of the cluster membership is evaluated from one census to the next, as well as across series of census years. Standardized scores (also know as "Z" scores) are used to eliminate a weighting bias between the variables. The variables used are the same employment categories used for the other analyses.

Diversity Index

Another method of measuring the economic specialization of an urban area is to create a diversity index. Diversity index scores range from "0" for perfectly diverse employment, with equal numbers employed in each sector, to "1.0" for perfectly concentrated employment (employment entirely within one sector). Therefore, the higher the diversity score, the more economically specialized that city is. The drawback of a diversity index is that for most cities employment is already concentrated in other services, manufacturing, and trade.

LIMITATIONS AND OTHER COMMENTS

The data sets chosen for this analysis are remarkable in that they cover a long period of time for a large number of places. Unfortunately, other research questions about the relationships between economic development and modernization indicators cannot be easily asked as these indicators are only inconsistently available. For example, a break down of religion by city is only available for 1971 and literacy is available for a limited number of census years. No linguistic data are available by city, except for a very few, such as Calcutta, Mumbai, Chennai, Delhi and Chandigarh. Furthermore, these data were recorded only for the censuses of 1971 and 1991.

A geographic bounding issue is important to note here. Numerous state boundary changes have occurred in the post-Independence period. Prior to that time, India was either directly governed by the British in the various "presidency" and other states or ruled indirectly through the numerous princely states. To maintain consistency all general locations are referred to by their present state names. Region labels have also been applied.

Limitations also exist in the comparability of data. The 1991 data consist of both male and female labor force statistics instead of male only used for 1901 through 1971. In 1981, employment data for class I cities were not tabulated by the census, hence there is a gap in the census years considered.

Another weakness is the "fragility" of the data. Even though official, the data are often "misleading, deceptive, or partial, with frequent and confusing changes in definitions and categories" and cannot be used "without great care and circumspection" (Tomlinson 1993, 2). In some years, 1931 for example, cantonments (military reservations) adjoining certain cities are included in the respective city population totals. In other years cantonments are not included and in some years it is not known whether they were included or not (Davis 1951, 140). Nevertheless this data set, like many others, remains useful to analysis.

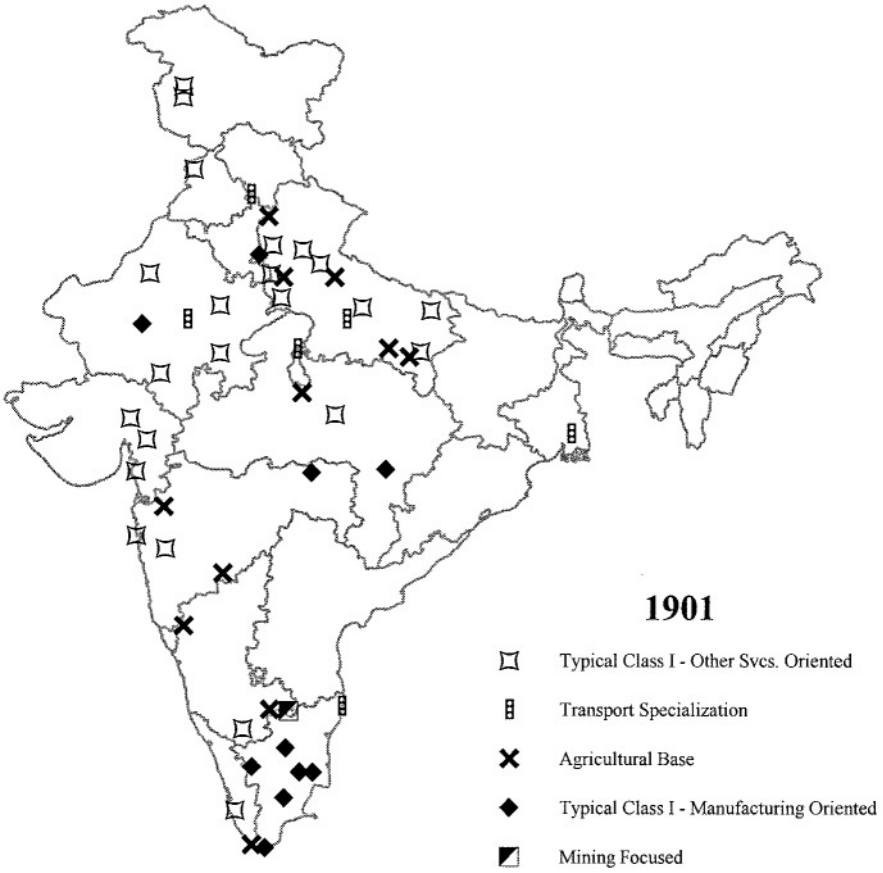
RESULTS AND ANALYSIS

In the case of India, an "extraordinary stability" of labor force structure is evident when viewing the summary percentages of employment by sector for the large cities only and for the country at large. This "stability" existed at both the aggregated (primary, secondary, and tertiary) level and dis-aggregated level (the eight or nine subsector categories). This discussion, given space considerations, is loosely framed in terms of chronology, and not in terms of the sectors, sub-sectors, or particular methods of functional classification.

1901

With the first census of the 20th century, there were only 24 Class I cities, though the 52 largest cities are considered here (Figure 9-1). Some regions of the country, such as Tamil Nadu, had many large cities while other regions had none (the far eastern portion of the country) or only a few (the states of Bihar, West Bengal and Orissa; the central Deccan Plateau). For the years 1901, 1911, and 1921, Calcutta, a relative urban giant throughout the century, is the only city of the eastern region of the country for which data could be gathered.

From use of Nelson's Method, factor analysis, and cluster analysis, it is obvious that agricultural sector activities in cities were more concentrated in the Northern Plains and in the southern tip of the country. Mining activities were important only in scattered locations. At this point, Mumbai, with the surrounding areas of Maharashtra, and



Cl. #	Cities	Ag Lab	Const	Cult	Mfg	Mining	Other Svcs	Trade	Transp
1	23	1%	2%	5%	27%	3%	40%	17%	5%
2	6	1%	2%	5%	19%	3%	35%	15%	17%
3	11	4%	2%	10%	23%	3%	40%	15%	4%
4	10	2%	4%	6%	35%	3%	24%	19%	6%
5	1	0%	1%	0%	5%	14%	69%	3%	8%
Tot.	51	2%	3%	6%	26%	3%	37%	16%	7%

Figure 9-1 Class I Cities of India: Cluster Analysis Groupings, 1901.

the state of Gujarat, was already a region of manufacturing. Textile production was especially important (Chandavarkar 1994). However, as found from analysis of the regression residuals, the level of service provision was higher than that expected with the given proportion of manufacturing. Cities in this region, with higher levels of both manufacturing and services, displayed a distinctive employment profile and were relatively concentrated in employment across sectors (as concluded from examining the diversity index). In the south, particularly the area of Tamil Nadu and Kerala, manufacturing was also relatively important, but with a lower level of services. Manufacturing was related to plantation agriculture (Krishnamurthy 1983, 543). At the time this region was the most diverse in terms of employment.

Service activities were scattered, but some regionalization can be discerned. Other services employment was greater in a broad arc stretching from Mumbai northeastward to western Uttar Pradesh. Trade and commerce predominated in the vicinity of Delhi and in the southern tip of the country (Kerala and Tamil Nadu).

A polarity between manufacturing employment and employment in other services exists in all census years starting with 1901. This "manufacturing versus other services" profile, found in the factor analysis, persists for all years and explains the most variance for 1901 and 1911. This manufacturing / other services dichotomy is strong in Tamil Nadu and the surrounding region and is weak in Uttar Pradesh.

Calcutta in this time period is a city of moderately concentrated employment, with higher than average employment in trade and commerce, construction, and transportation. From cluster analysis, it was found to be grouped with other transportation oriented cities.

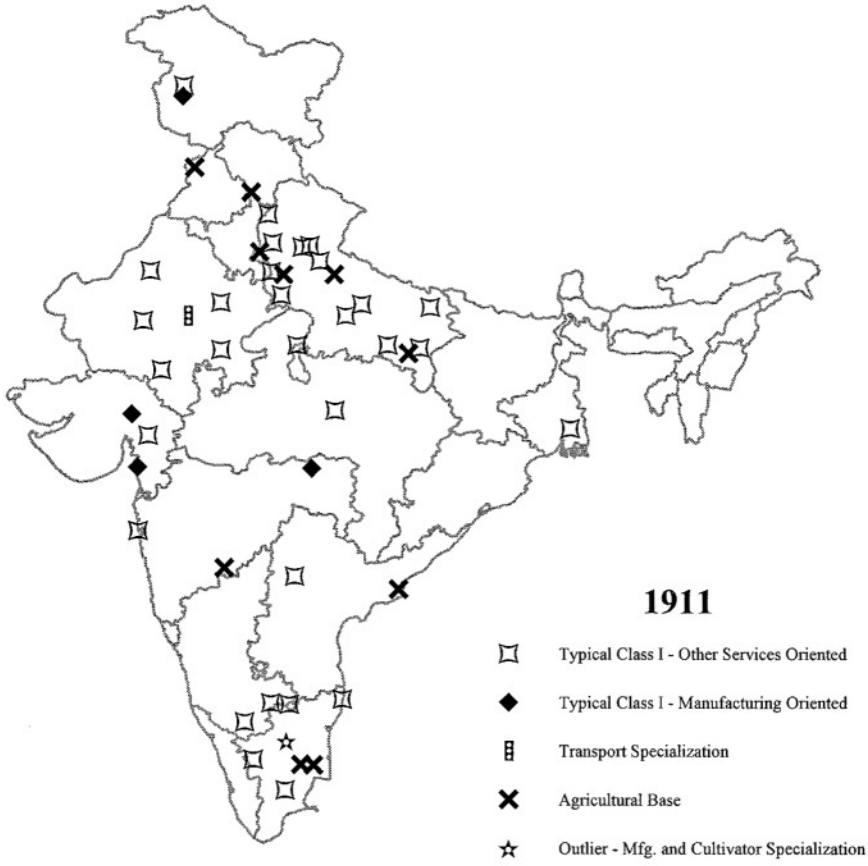
1911

Although the 1911 census encompasses fewer cities, most of the patterns evident 10 years earlier remain (Figure 9-2). Agriculture, again, is concentrated in Uttar Pradesh, especially the western portion of the province. However, the southern end of the country has become less specialized in agriculture. Mining remains scattered, but, on average forms a larger component of employment because of its great importance in places such as Kolar Gold Fields, where mining accounted for 61% of the workforce.

Secondary activities become less concentrated. Manufacturing becomes more scattered and so is construction, except for a mild concentration in Rajasthan. Tertiary activities continue their patterns also as trade and commerce are clustered around the Delhi region and in the southern tip of the country. There is the same arc of other services stretching from Mumbai to western Uttar Pradesh.

In terms of diversity, there is no real region of concentration, but the area of diversity remains the same in Tamil Nadu and Kerala. The manufacturing / other services polarity is difficult to regionalize in regard to manufacturing, but it is clear that in a belt stretching from Rajasthan through Madhya Pradesh to Uttar Pradesh the cities are service-oriented. This belt resembles the arc that is present for other services.

Another polarity, which is trade and commerce versus mining, is easily described, yet difficult to regionalize. Trade and commerce centers are scattered about evenly,



Cl. #	Cities	Ag Lab	Const	Cult	Mfg	Mining	Other Svcs	Trade	Transp
1	23	1%	4%	4%	21%	5%	44%	15%	7%
2	6	1%	5%	2%	46%	2%	25%	15%	6%
3	11	0%	5%	3%	16%	2%	30%	10%	35%
4	10	4%	3%	7%	27%	3%	31%	18%	7%
5	1	1%	1%	34%	40%	1%	9%	11%	3%
Tot.	51	1%	4%	5%	25%	4%	38%	15%	7%

Figure 9-2 Class I Cities of India: Cluster Analysis Groupings, 1911.

reflecting the central place functions they serve and mining centers are site specific to local resource attributes. This factor also appears repeatedly over the entire study period.

1921

In 1921 there were 6 additional Class I cities, bringing the total to 29, out of 53 in the data set (Figure 9-3). Unlike the previous decade, these cities began to comprise a growing share of the urban population, and have done so ever since.

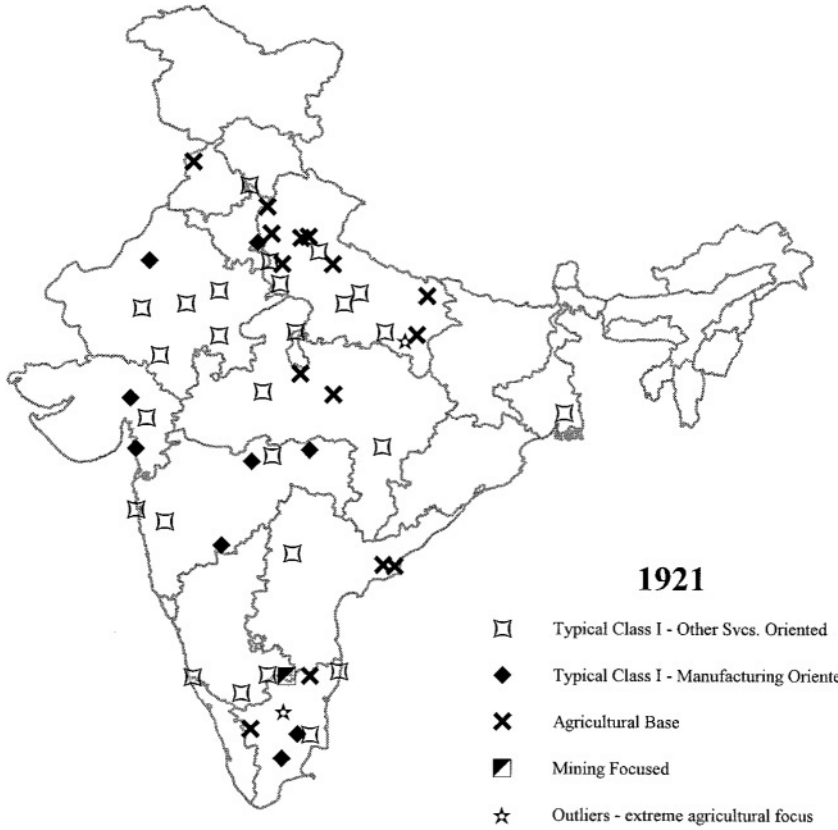
In the west region, primary sector activities of all three types continue to be of relatively little importance, both in the aggregate and in considering the patterns of specialization. Primary sector employment in this period is still greater for the south region as a whole. Again, much of this is due to the importance of mining in selected centers. The specialization in cultivators very apparent twenty years earlier had disappeared. The greater specialization in agricultural laborers remained for this census, but disappears, too, over the next decade. Calcutta, still the only city under consideration in its region (east), demonstrates the lowest level primary sector employment for the third straight census period. The northwest region shows only a slight concentration of cities which have a greater specialization in agricultural activities.

Employment in secondary activities, remaining stagnant for the country generally and for each of the regions, still shows a fairly diffuse pattern, though cities specializing in manufacturing do become more prevalent in the area of Delhi. Construction employment begins to show an east / west pattern, with higher levels in the latter, especially Rajasthan.

Patterns of specialization for tertiary sector activities remain roughly the same as in 1911, as evidenced by the use of Nelson's method, cluster analysis, and factor analysis. The broad arc of specialization in other services, stretching from Mumbai to Delhi remains, but is beginning to dissipate in the northernmost end. The two areas of specialization in trade and commerce, the Delhi region and the southern part of the Deccan Peninsula, are joined by a third and much smaller concentration in the center of the Deccan Plateau.

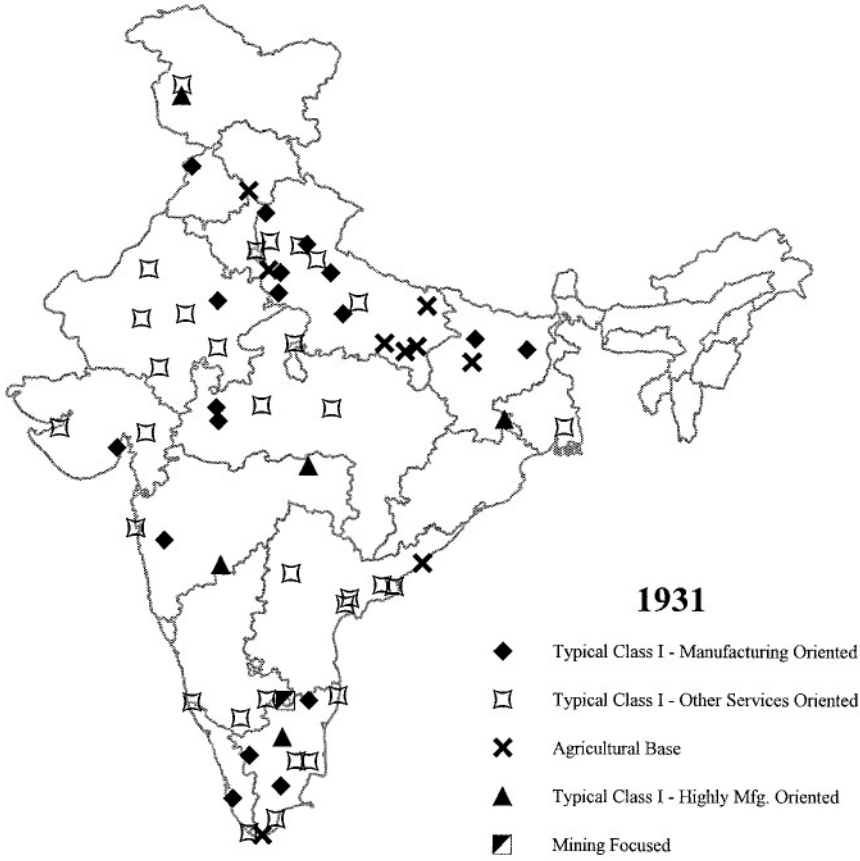
Other services employment, for a given level of manufacturing employment, is much lower in Kerala and Tamil Nadu. This is consistent with the first two census periods. The broad arc of greater employment in services (relative to manufacturing) stretching from the Mumbai-Pune area through to Uttar Pradesh has shrunk to just the area of Rajasthan and the cities of Ahmedabad, Mumbai, and Pune. The area of Uttar Pradesh and the other northern states now shows a greater mix in this regard. Too little information exists about urban centers in the east to make a generalization concerning this bivariate relationship.

Multivariate relationships (determined with factor analysis and cluster analysis) are apparent and do have a spatial pattern for this census period. The manufacturing and trade versus other services factor shows a strong orientation toward the latter in Kerala and Tamil Nadu. A mining and transportation versus manufacturing factor shows the importance of mining in several southern centers, and centers loading highly nega-



Cl. #	Cities	Ag Lab	Const	Cult	Mfg	Mining	Other Svcs	Trade	Transp
1	26	1%	3%	5%	18%	2%	47%	16%	8%
2	9	2%	6%	4%	35%	2%	33%	15%	4%
3	15	8%	2%	13%	20%	2%	34%	18%	4%
4	1	1%	1%	8%	6%	61%	17%	4%	1%
5	2	14%	1%	47%	11%	5%	10%	12%	1%
Tot.	53	4%	3%	8%	21%	3%	39%	16%	6%

Figure 9-3 Class I Cities of India: Cluster Analysis Groupings, 1921.



Cl. #	Cities	Ag Lab	Const	Cult	Mfg	Mining	Other Svcs	Trade	Transp
1	18	2%	2%	5%	22%	2%	40%	21%	5%
2	31	1%	5%	3%	18%	2%	46%	16%	9%
3	9	7%	2%	12%	19%	3%	36%	15%	6%
4	5	2%	2%	2%	50%	2%	28%	7%	5%
5	1	1%	8%	19%	7%	48%	9%	6%	2%
Tot.	64	2%	3%	5%	22%	3%	41%	16%	7%

Figure 9-4 Class I Cities of India: Cluster Analysis Groupings, 1931.

tive in this factor are rather dispersed. The agricultural factor, showing a bias to cultivators and agricultural laborers, shows negative values in Rajasthan, Gujarat, and in both Mumbai and Surat. Centers which are strongly biased positively toward this factor are very dispersed.

Diversity of employment is again greatest in the southern states of Kerala and Tamil Nadu and concentration of employment greatest in a belt running from Ahmedabad (in Gujarat) southwards fully into western Maharashtra, including Surat, Mumbai and Pune along the way. These patterns mirror the patterns of the multivariate analysis mentioned above.

1931

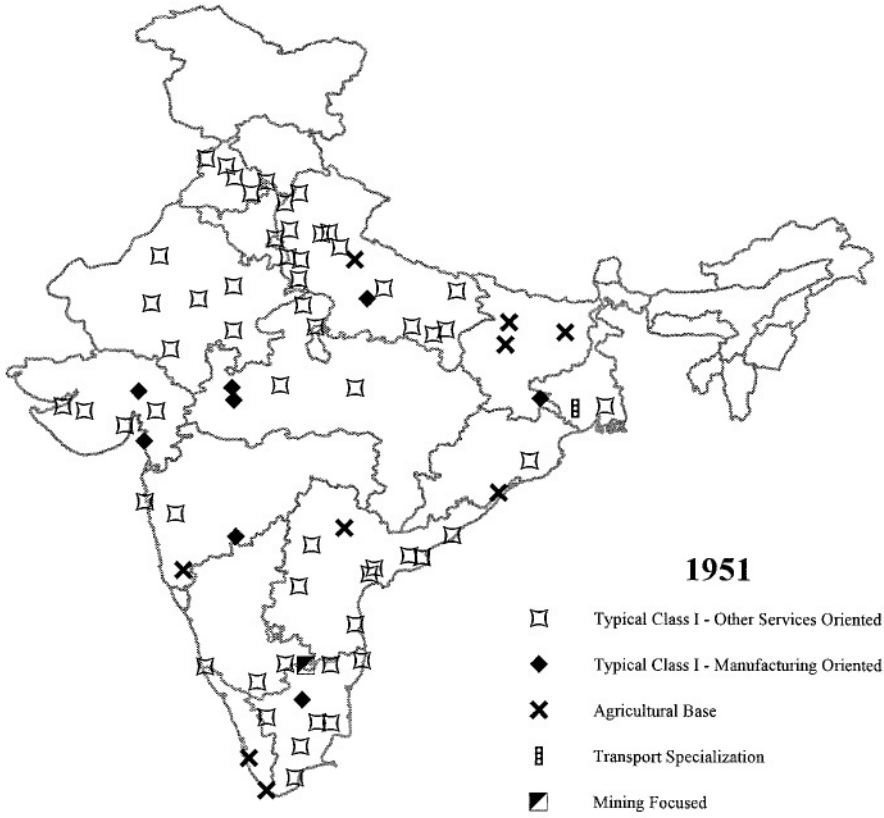
By 1931, regional convergence was occurring in each of the three macro-sectors (primary, secondary and tertiary). Additionally, many of the patterns of particular subsectors changed considerably from the preceding period (Figure 9-4).

For the primary sector, patterns of specialization for cultivators and agricultural laborers both changed drastically and came to resemble each other quite closely. The cities in the area of Bihar and eastern Uttar Pradesh both show a greater proportion of both types of agricultural occupations. As usual, mining is more important in particular centers throughout the country.

There are no concentrations of centers either specializing in manufacturing or having low proportions of workers employed in manufacturing. For construction, there is a strong concentration of specialized cities in Rajasthan - even stronger than in the first three censuses. There is also a weak cluster of construction-specializing centers in the southern reaches of the country.

For tertiary activities, employment in other services, like that of manufacturing, has "lost its pattern" of concentration, as the cities which specialize in this category are rather evenly dispersed throughout the country. For trade and commerce, there is still a region of specialization extending from Amritsar in the far northwest through Punjab, Haryana, and Uttar Pradesh to the frontier of Bihar. The region of specialization in the southern tip of India that existed for 1901 to 1921 has disappeared. Transportation again shows no simple and generalizable pattern.

The level of other services employment, for a given level of manufacturing employment, shows a mixed pattern throughout the country. The only concentration is in eastern Uttar Pradesh, where other services employment is low relative to manufacturing employment. This same region plus the state of Bihar shows up as part of another region - one characterized by a high proportion of agricultural laborers and cultivators (as part of a mining / agricultural laborer / cultivator factor). This is confirmed by the cluster analysis. The rest of the country shows a bias in the other direction. The regional complex of eastern Uttar Pradesh and Bihar even shows one additional regionalization. This multivariate measure pits transportation and construction employment verus agricultural laborer employment and we find the region to be biased against transportation and construction. For this same multivariate measure the state of Rajasthan finds five of its six large cities highly biased in the opposite direction (to



Cl. #	Cities	Ag Lab	Const	Cult	Mfg	Mining	Other Svcs	Trade	Transp
1	56	1%	3%	2%	24%	2%	38%	21%	9%
2	8	1%	3%	1%	50%	1%	22%	18%	5%
3	9	4%	3%	6%	22%	4%	34%	19%	8%
4	1	1%	2%	3%	33%	5%	15%	8%	34%
5	1	2%	2%	10%	6%	56%	13%	9%	2%
Tot.	75	1%	3%	3%	26%	3%	35%	20%	9%

Figure 9-5 Class I Cities of India: Cluster Analysis Groupings, 1951.

transportation and construction and against agricultural laborers). Still, cluster analysis takes this same group of cities and categorizes them into what can be termed an "other services" oriented classification, with a higher than average transportation percentage.

1951

Wartime exigencies precluded the collection of employment statistics for Class I cities in 1941. Twenty years, then, elapsed before such data were collected again and over this twenty year period Class I cities doubled in size relative to the overall population and also doubled in number.

The patterns of primary sector specialization which became evident in 1931 remained not only for 1951, but also in large extent up to the present (Figure 9-5). All along the Ganges Plain, but primarily in Uttar Pradesh and Bihar, all methods of classification point to the region retaining a relative strong agricultural orientation, even as the large urban centers at large see a large decline in the share of primary sector employment.

Secondary sector activities regionalize to a great extent. Manufacturing activities seem to "cluster" in five areas: 1) The Ahmedabad to Surat corridor; 2) Calcutta and its immediate hinterland; 4) The Mumbai / Pune corridor; and 5) in the states of Kerala and Tamil Nadu. Construction employment is higher along a north-south corridor centered on Delhi and is also higher in a weakly formed cluster centered on the juncture of Karnataka, Tamil Nadu and Andhra Pradesh.

In the tertiary sector, other services employment is proportionally higher across many of the cities in Rajasthan, Punjab, Haryana, Uttar Pradesh and Bihar. This area can hardly be considered a "region" as it is so large. A number of southern cities, too, seem to score highly in this respect, including the coastal cities along the Bay of Bengal from Bhubaneswar (in Orissa) south to Nellore (Andhra Pradesh). Centers with a greater proportion of workers employed in trade and commerce employment are more prevalent in Gujarat, Rajasthan, western Uttar Pradesh, and especially Punjab.

At this time though, the relationships with other sectors start to become more evident. While it is already known that the negative correlations between construction employment and the agricultural sectors are statistically significant in some years (1921, 1931, and 1991), it becomes especially evident that a negative relationship exists when the factor analysis maps are considered. Regional occupational profiles at this point become more obvious. With diversity of employment, the patterns are not generalizable at a regional scale. Areas of concentration are present though in Punjab, and Rajasthan.

1961

The regional complexes that were discerned in 1951 become even clearer in 1961. The ability to discern these complexes is aided in two ways. First, with 101 of the 102 Class I cities in this analysis, the geographic coverage becomes more widespread (Figure 9-6). Second, the division of manufacturing into modern and traditional sectors

(household industries) allows the patterns of each to emerge. Previously, the grouping of these categories together obscured the geographic patterns.

As noted earlier, agricultural activities remain more characteristic of cities in Bihar. However, a number of centers scattered throughout the country specialize in both agricultural laborers and cultivators, but more so in the southern half of the Deccan Peninsula.

No longer grouped with household crafts activities, modern sector manufacturing activities standout at this time. Starkly more obvious as manufacturing areas are the Ahmedabad to Surat corridor; 2) Calcutta and its immediate hinterland; 4) The Mumbai / Pune corridor; 5) a set of dispersed centers within the states of Kerala and Tamil Nadu; and 5) a series of cities running from Amritsar southeasterly through Delhi to Kanpur. Household industries, too, emerge as having a very regional bias. While centers highly specialized in household industries are scattered through all regions, they are most prominent in Bihar, eastern Madhya Pradesh, and Uttar Pradesh. A less intense region is found in Tamil Nadu. This regionalization provides a strong contrast with construction employment, which, as in 1951, is much higher in Rajasthan and western Madhya Pradesh.

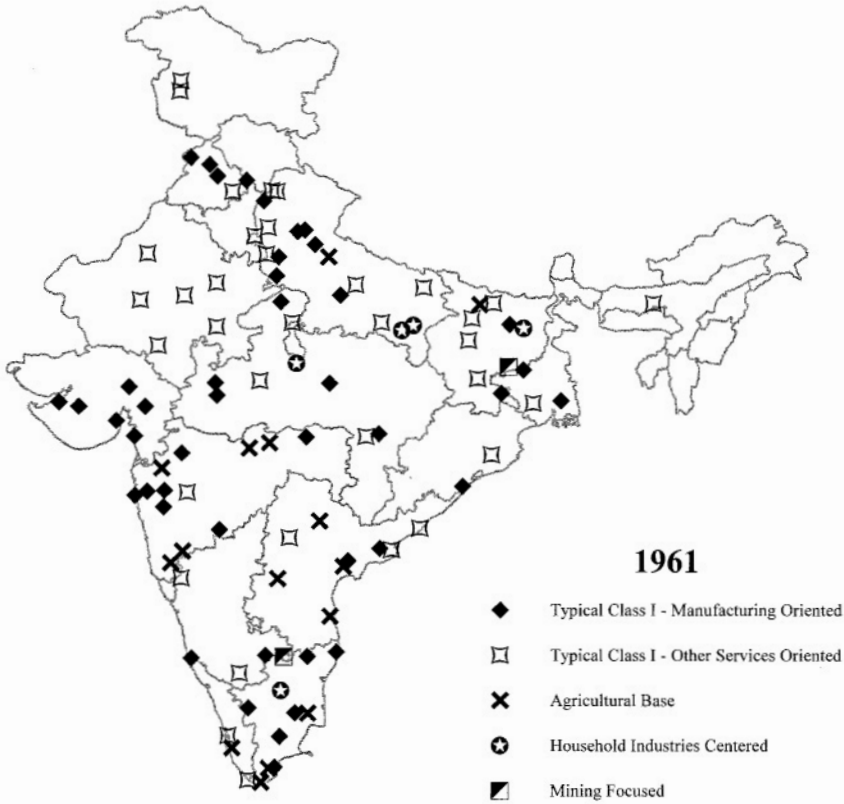
The broad band of other services focused centers that ran across the northern tier of states in 1951 has shrunk into two subareas. The first consists of Rajasthan and western Uttar Pradesh and the other is wholly within Bihar. Meanwhile the trade and commerce activities have a pattern of specialization.

Two elements of multi-dimensionality in occupational structure (an agricultural bias and the services versus manufacturing dichotomy) remain, whether uncovered by factor analysis, regression analysis, or cluster analysis. The patterns for "other services versus manufacturing" factor found in 1951 solidify, but the patterns for the agriculturally-biased centers do not. While Nelson's Method and factor analysis indicate that Bihar is becoming the region where agricultural specialization is most prominent, the cluster analysis indicates that the state is an area of mixed centers.

Added to these is an agricultural laborers and household industries versus transportation element found in factor analysis and also evident in the cluster analysis. This complex of occupational structure is of an evidently more "traditional" focus, as indicated from the factor analysis. The overlap between the cities specializing in agriculture (primary sector) and those specializing in household industries (secondary sector) is found through all of the classification methods. The ties between the activities, however, can be more conclusively drawn with the multivariate analysis. There are several clear patterns of employment diversity. The areas of concentration are nearly the same as the regions of manufacturing - West Bengal, a center based on Delhi, and the Ahmedabad to Pune corridor. Conversely, all other places seem to be areas of diversity.

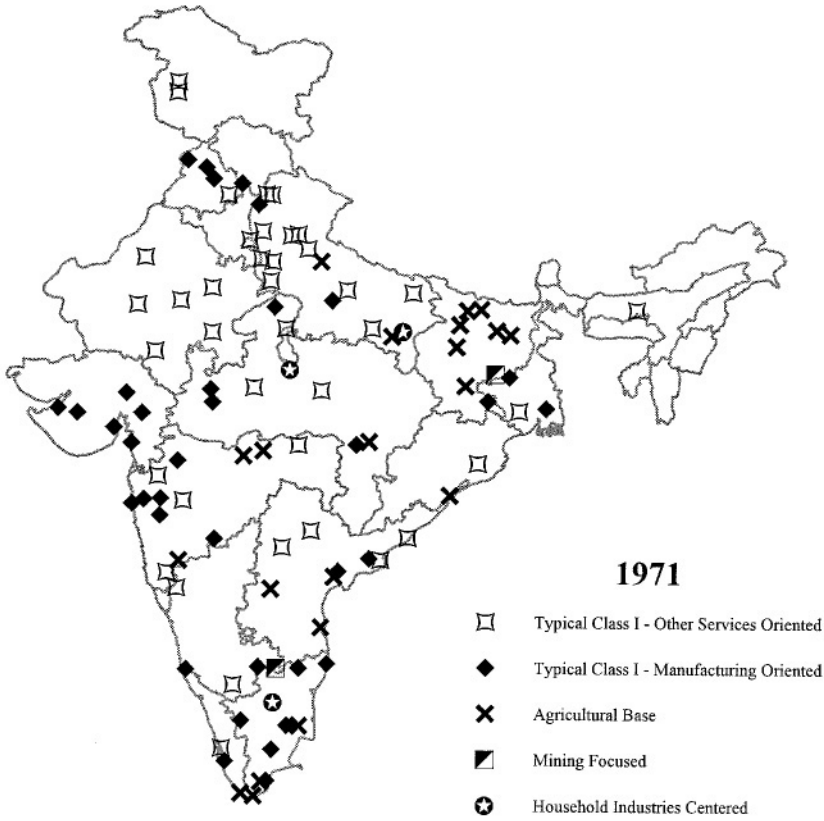
1971

In 1971 the regions of specialization become even more identifiable, even though there was little change in geographic coverage of the cities in the analysis (Figure 9-7). Regardless of the classification procedure, it becomes obvious that primary sector ac-



Cl. #	Cities	Ag Lab	Cons	Cult	Hshld Ind	Mfg	Min	Other Svcs	Trade	Trans
1	44	0%	3%	1%	4%	32%	1%	27%	19%	11%
2	35	1%	5%	2%	4%	17%	2%	40%	16%	14%
3	15	3%	4%	4%	6%	20%	2%	33%	19%	10%
4	5	1%	3%	3%	23%	15%	1%	28%	19%	8%
5	2	1%	2%	11%	2%	10%	42%	17%	9%	5%
Tot	101	1%	4%	2%	5%	24%	2%	32%	18%	12%

Figure 9-6 Class I Cities of India: Cluster Analysis Groupings, 1961.



Cl. #	Cities	Ag Lab	Cons	Cult	Hshld Ind	Mfg	Min	Other Svcs	Trade	Transp
1	39	2%	4%	2%	4%	19%	2%	32%	19%	16%
2	36	1%	3%	1%	3%	35%	1%	21%	23%	12%
3	21	6%	4%	4%	5%	18%	2%	27%	24%	12%
4	2	1%	2%	1%	1%	13%	51%	10%	14%	7%
5	3	1%	3%	3%	21%	18%	1%	23%	22%	10%
Tot.	101	2%	3%	2%	4%	25%	3%	26%	22%	13%

Figure 9-7 Class I Cities of India: Cluster Analysis Groupings, 1971.

tivities become more yet more ossified, with Bihar and eastern Uttar Pradesh continuing to have the greatest proportion of employment as cultivators and agricultural laborers.

Manufacturing, too, solidifies geographically. The areas of manufacturing that became obvious in 1951 become even more discrete. With construction activities a spatial dichotomy begins to arise, with the western and southern portions of the country decidedly more construction focused than the eastern portion. This division can be seen, from factor analysis, as a "construction versus household industries" divide. Further, it may be interpreted as a traditional activities versus modern sector activities divide. This interpretation can be made when one considers the maps of the individual sectors (as drawn from Nelson's Method) and especially by considering the multi-dimensional aspects (factor analysis and cluster analysis).

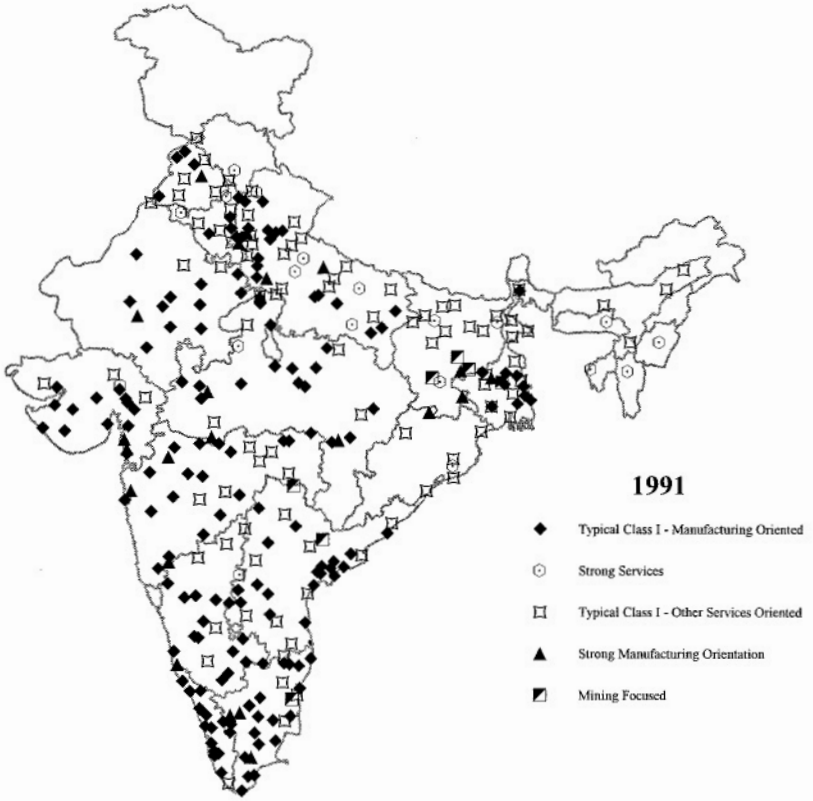
1991

As noted above, Census data for 1981 are not available. The patterns for 1971 become even more discrete for 1991. In terms of diversity, the regionalization is the same as for the previous census, only that cities in Bihar have become noticeably more diverse in their employment profile. With 1991 the geographic coverage expands considerably, as the number of cities in the analysis nearly triples, rising from 101 to 296 (Figure 9-8). At this point, nearly one in six persons lives in a Class I city. With this growing proportion of the population and workforce, the data can be used more concretely to make statements about the overall economic structure.

A greater proportion of agricultural-related occupations are found in a belt of cities throughout the Ganges Plain. This is especially evident when examining the cultivators employment, where activities are proportionally more important occupations throughout Uttar Pradesh and Bihar. Agricultural laborer specialization is more limited, but is prominant in Bihar. It is also prominent (but without the cultivators association) in Kerala, the area straddling Karnataka and Andhra Pradesh, and especially in the vicinity of the Godavari and Krishna river deltas, on the eastern edge of the Deccan Peninsula. For the first time, clustering appears for mining specialization. This is a result of the government's development planning efforts in the Damodar River valley, a number of industrial centers have been developed which utilize the natural resources of the area, of which coal is the most notable (Dutt and Geib 1987, 77).

The seven new centers of the far eastern region of the country, which became Class I centers, all are highly specialized in other services, both generally and in relation to the amount of manufacturing employment. As administrative centers (several are state capitals) this is expected.

The multi-dimensionality of occupational structure becomes most evident in this time period. From the factor analysis we find the polarities found in previous years: other services versus manufacturing; trade and commerce versus mining; and construction versus household industries. An agricultural laborer and cultivator factor, however, remains the strongest, as it explains the greatest amount of the variance. The factor analysis complements and confirms aspects of these dimensions, as the two most



Cl. #	Cities	Ag Lab	Cons	Cult	Hshld Ind	Mfg	Min	Other Svcs	Trade	Transp
1	159	6%	5%	3%	5%	22%	1%	24%	23%	10%
2	19	4%	5%	4%	2%	9%	0%	50%	19%	5%
3	91	5%	5%	4%	2%	13%	0%	33%	25%	10%
4	23	3%	5%	2%	2%	48%	0%	17%	17%	6%
5	7	4%	4%	2%	1%	7%	43%	19%	12%	7%
Tot	299	5%	5%	3%	3%	20%	2%	27%	22%	9%

Figure 9-8 Class I Cities of India: Cluster Analysis Groupings, 1991.

important clusters continue to be categorized as services-oriented or manufacturing-oriented. There are several distinctive aspects to the 1991 census cluster analysis that are not uncovered via other classificatory procedures. First, is that the agriculturally oriented cluster disappears for the first time, perhaps indicating the increasingly marginal importance of such employment in Class I cities. Second, there emerges *both* a *strongly* service-oriented cluster and a *strongly* manufacturing-oriented cluster. The patterns found in the diversity index correspond to other regional phenomena more closely than in the past, too. Considering the maps together, a complex of service oriented centers which retain a relatively high level of agriculturally based employment, further characterized by a higher level of employment concentration, exists throughout the Ganges Plains, stretching all the way from Punjab to Bihar and Orissa.

Taken together, the results of the data analysis allow statements to be made about regional economic configurations and reconfigurations that have occurred throughout India during the 20th century. Sector shifts, as indicated by labor allocations, indicate a movement along a development continuum. The areas of the country that are most developed are those, that if not manufacturing oriented, are certainly less oriented to primary sector activities. Whether or not the declines of agricultural importance are due to rationalization of labor within the sector or whether the changes are due to an economy that is switching to other sectors, the decline still indicates transition.

Transition from a reliance on traditional manufacturing (household industries) to a reliance on modern sector manufacturing also indicates movement along a development continuum. Since 1951, when data first reflected a difference between these activities, traditional manufacturing activities have been in relative decline.

Spatial patterns of transition are also evident. The patterns of these changes indicate that the four megacities (Chennai, Mumbai, Calcutta and Delhi) and their surrounding urban centers have "modernized" or gone through transitions earlier than other Class I cities. Last to undergo the transition are the Class I cities of the Ganges Plain in the area of Bihar and eastern Uttar Pradesh. Patterns of change related to services are clouded by the role of many cities as administrative centers. Many other services specialized centers, especially prior to the 1950, achieved this employment profile as a result of their being administrative centers for princely states. Many of these centers have become less services oriented as administrative roles have been gradually shifted to large administrative (state level) centers.

CONCLUSION

Certainly, the answers to the research questions posed are far more complex and nuanced than those same questions suggest. The forces of economic development do not wash over a country evenly, especially a large country such as India. Even when these forces inundate the entire economy, the eddies and swirls of locality lead to many different outcomes. Aggregate economic changes, such as those relating to occupa-

tional structure, are at best poor indicators of the social and economic development occurring within a country. These indicators become even less valuable when it is realized that such data are often not as robust, consistent, or reliable as they first appear. However, such indicators do help in setting the broad context of inquiry. Furthermore, these are often the best indicators that are available for geographers, historians, and urbanists alike. Functional classification itself, as a methodology, can be assessed as to how useful it is in answering these questions. These methodological questions, though more straightforward, nonetheless hold significant implications for future research.

Given these considerations, much can still be said about the economic development process and urbanization in terms of the urban employment data considered here. A critical point to be made is that the changes and regional relationships that were created by the colonial economy are not always those expected.

How the rise of the cities is relevant is in how closely they relate to the changing patterns of functional specialization. Regions of specialization in manufacturing, centered on the four primate cities, have developed slowly yet steadily throughout the study period. One recent study by Dutt and Parai (1999) has examined the urban corridor formation in India, most of which is between these primate cities. These manufacturing areas have developed despite the very small growth in the proportion of manufacturing employment in urban areas as a whole. Furthermore, this occurred even as control of the economy passed out of British hands into the hands of India's national government and the indigenous business community. This evolution of manufacturing regions centered on regional primate cities is evident in the factor analysis maps (multivariate) and especially in the maps portraying classification via Nelson's Method (univariate).

So while the patterns found do reflect the changes, they do so in a fashion which is not readily apparent. The changes were not simple, abrupt and clear switches from externally-induced, exploitative / extractive relationships to internal, growth-generating positive relationships. Some aspects of each of these two could and did coexist within the same geographic context. In fact, both could even be strengthened simultaneously.

One particular illustration of this is the case of Mumbai in the early 1900s. Chandavarkar (1994, 29) comments that Mumbai was more than an "enclave of foreign trade and foreign ways" because it was at the same time establishing its place within an internal economy. The cotton textile industry, which employed as much as 16.2% of the workforce (in 1921), was highly capitalized and took great advantage of the economies of scale available via mechanization and rationalization. It was the "exports" from Mumbai which displaced the traditional handicrafts textile industries in Rajasthan. The collapse of pre-modern manufacturing in Rajasthan across most product types was due then to economic integration brought on by the railway and competition from manufacturers within India (Krishnamurthy 1983, 545-6). This decline in manufacturing had largely taken place by 1901, hence the appearance of Rajasthan as an area of services (instead of manufacturing) during most of the 20th century.

Even more surprisingly, the change to a post-colonial economy, instead of reversing or countering relationships from the colonial economy often fail to alter, or, even in some cases, reinforce regional characteristics and inter-regional relationships.

The regional hierarchies, based on the four regional primate cities, exist throughout the 20th century. Throughout the time period, the correspondence between patterns of functional specialization (especially for manufacturing) and the patterns of population primacy, come to resemble each other more closely. The regional poles (the primate cities) came to have relationships with nearby regions, as discussed in the case of Mumbai and its hinterland region of Rajasthan.

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CHAPTER 10

AMBIENT AIR QUALITY IN DELHI 1988-1994: A SPATIO-TEMPORAL ANALYSIS

BHUPINDER SINGH MARH AND SANJAY KUMAR

Air pollution or the deterioration of the ambient air quality in metropolitan cities is a matter of great concern. Delhi, the national capital of India, has earned the dubious distinction of being one of the most polluted capitals of the world. This is indicated by several news items that keep on appearing in daily newspapers coming out of Delhi and some reports from the Centre for Science and Environment (CSE), a Delhi-based environmental watchdog organization (Sharma and Roychowdhury 1996; Agrarwal and Narain 1999). Delhi has been reported as the fourth most polluted city in the world (Sharma and Roychowdhury 1996) and it has been shown that a person living in Delhi might be inhaling enough dirty air to produce similar effects as in a miner's lung (*Hindustan Times* June 22, 1999). The gravity of the air pollution problem of Delhi is being realized and the so-called polluting industrial units are being told to move out of Delhi (*Hindustan Times* July 9, 1999).

Although the air pollution is concentrated in Delhi, this is by no means only a local problem, but rather is regional. A CSE report (*Hindustan Times* July 3, 1999) has gone so far as to suggest that the tremendous amount of air pollution being generated in the South Asian region might have led to acid rain during the monsoons of 1999. In any case ambient air pollution in Delhi has increased enormously and is reaching alarming proportions. In the present chapter an attempt is made to study the spatio-temporal trends of ambient air quality in the Delhi region on the basis of data published by the Central Pollution Control Board (CPCB) of India for the period 1988-1994.

AIR POLLUTION

Air pollution is defined by the WHO as "The presence in the air of substances put there by acts of man in concentration sufficient to interfere with the comfort, safety, or health of man or with the full use or enjoyment of his property" (Karpagam 1990). The term air pollution is, thus, applied when there is an excessive concentration of foreign matter in the atmosphere which is harmful to humans or their environment. As resources are being used more and more in modern industrial civilization, progressively greater air pollution is being caused (Turk 1985).

The pace and magnitude of changes in industrialization and automobile uses have far-reaching impact on the environment, particularly in urban areas. Air pollution is

one main component of this overall degradation. There are mainly two types of air pollutants: primary pollutants produced by the direct combustion of fuel, and secondary pollutants formed by chemical and photochemical interactions within the atmosphere. Though more than one hundred pollutants have been identified, sulfur dioxide (SO_2), oxides of nitrogen (NO_x) and suspended particulate matter (SPM) are considered to be the best indicators of air pollution.

Sulfur dioxide exists in the atmosphere in the form of several gaseous compounds, as well as in a variety of chemical species in condensed phase of aerosols and cloud droplets. Nitrogen from different sources oxidizes to form nitrogen oxides (NO) and nitrogen dioxide (NO_2). These two together are referred to as NO_x. Suspended particulate matter (SPM) comprises: (i) very fine particles, solid and liquid, between the size of 1.0 and 100 mm, suspended in air (Lal 1987), including carbon, metallic dust, tars, resins, aerosols, solid oxides, nitrates and sulphates, (ii) coarser particles (over 200mm) including carbon particles and heavy dust that is quickly removed by gravity from the air (Swarup et al. 1992).

DATA AND METHODOLOGY

The data on concentration of SPM, SO_2 and NO_x reported at six locations in Delhi (Figure 10-1) by the Central Pollution Control Board of India and published as mean monthly averages are used in the present study. The data are collected by air pollution monitoring instruments. The high-volume sampler developed by ENVIROTECH is used to measure the concentration of SO_2, NO_x and SPM in the ambient air. ENVIROTECH's APM 410 high volume sampler is used to measure the concentration of suspended particulate matter in air. The APM 411 gaseous sampling attachment is used for the measurement of gaseous pollutants. The values are averaged over monthly periods before publication.

Methodology

Time series analysis of the data has been carried out to understand the past trends. Results are summarily presented in Table 10-1. The overall trend is determined by fitting a least squares regression line to the mean monthly values. The values of Pearson's coefficient of correlation *(r),* the coefficient of determination *(r^2)* and coefficient of alienation *($Ö(1-r^2)$)* are used to determine the time dependence of the pollutant concentration.

Spatial variation in the concentration of different pollutants has been analyzed by mapping the concentration values with isolines (Figure 10-1 - Figure 10-3). Pockets of different levels of pollutant concentration are thus identified. Such analysis is done for the yearly averages. Problem areas and the problem periods can be highlighted by this analysis.

Table 10-1
Results of the Time Series Regression Analysis of Monthly (84 Months) Ambient Air Quality Measures of Recording Stations in Delhi: 1988-1994

Station	Intercept	Slope	$\sqrt{(1-r^2)}$	r	r^2
(A)		**Sulfur Dioxide (SO_2)**			
Ashok Vihar	3.381	0.233	0.628	0.778*	0.606
Janakpuri	5.472	0.148	0.732	0.681*	0.464
Nizamuddin	4.942	0.157	0.848	0.531*	0.282
Shahdara	9.070	0.176	0.903	0.429*	0.184
Siri Fort	1.100	0.195	0.606	0.796*	0.633
Shahzada Bagh	0.530	0.389	0.628	0.778*	0.605
		(B) Oxides of Nitrogen (NO_x)			
Ashok Vihar	22.490	0.134	0.883	0.470*	0.221
Janakpuri	21.520	0.199	0.647	0.762*	0.581
Nizamuddin	5.035	0.413	0.598	0.802*	0.643
Shahdara	8.300	0.353	0.723	0.691*	0.477
Siri Fort	6.580	0.340	0.588	0.809*	0.654
Shahzada Bagh	9.479	0.378	0.645	0.764*	0.584
(C)		**Suspended Particulate Matter (SPM)**			
Ashok Vihar	310.70	0.191	0.999	0.036	0.001
Janakpuri	312.70	1.328	0.939	0.342	0.117
Nizamuddin	147.70	3.643	0.793	0.610*	0.372
Shahdara	177.90	2.888	0.885	0.466*	0.218
Siri Fort	156.60	2.910	0.854	0.520*	0.271
Shahzada Bagh	277.70	2.507	0.945	0.327	0.107

* *These positive r values are significant at 0.05% level for 82 degrees of freedom.*
Station Locations are given in Figure 10-4 in 174.

Table 10-2 National and WHO (Annual[1]) Ambient Air Quality Standards

Pollutant	Indian Air Quality Standards			WHO Standards
	Sensitive Areas	Residential Areas	Industrial Areas	
Sulphur Dioxide, SO_2 ($\mu g / m^3$)	15	60	80	40-60
Nitrogen Oxides, NO_x ($\mu g / m^3$)	15	60	80	---
Suspended Particulate Matter, SPM ($\mu g / m^3$)	70	140	360	60-90

Table 10-3 Results of the Comparison of Recorded Values with CPCB(I) Standards

Year	Stations with positive Z_{Mi} for SPM	
	Number	Names
1988	2	Janakpuri, Shahzada Bagh
1989	3	Janakpuri, Ashok Vihar, Shahzada Bagh
1990	2	Janakpuri, Shahdara
1991	2	Janakpuri, Shahzada Bagh
1992	2	Janakpuri, Siri Fort
1993	4	Janakpuri, Shahdara, Siri Fort, Nizamuddin
1994	3	Janakpuri, Shahdara, Nizamuddin

Table 10-4 Year-Wise Distribution of Positive Z_{Mi} Values in Delhi

Stations	Number of positive Z_{Mi} values							
	1988	1989	1990	1991	1992	1993	1994	Total
Ashok Vihar	0	1	0	0	0	0	0	**1**
Janakpuri	1	1	1	1	1	1	1	**7**
Nizamuddin	0	0	0	0	0	1	1	**2**
Shahdara	0	0	1	0	0	1	1	**3**
Shahzada Bagh	1	1	0	1	0	0	0	**3**
Siri Fort	0	0	0	0	1	1	0	**2**
Total	**2**	**3**	**2**	**2**	**2**	**4**	**3**	**18**

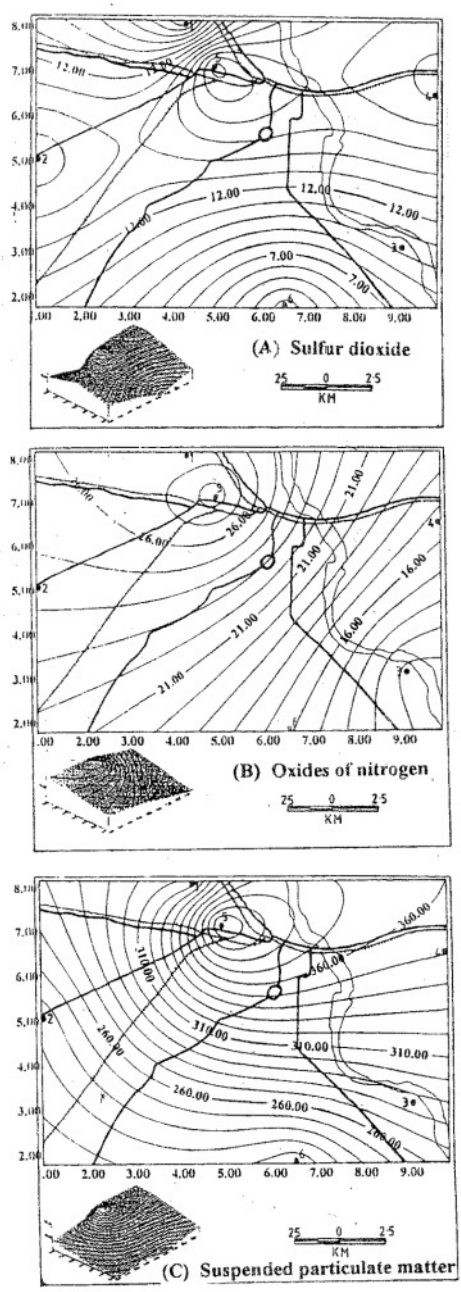


Figure 10-1 Concentrations of Ambient Air Quality Measures: 1989.

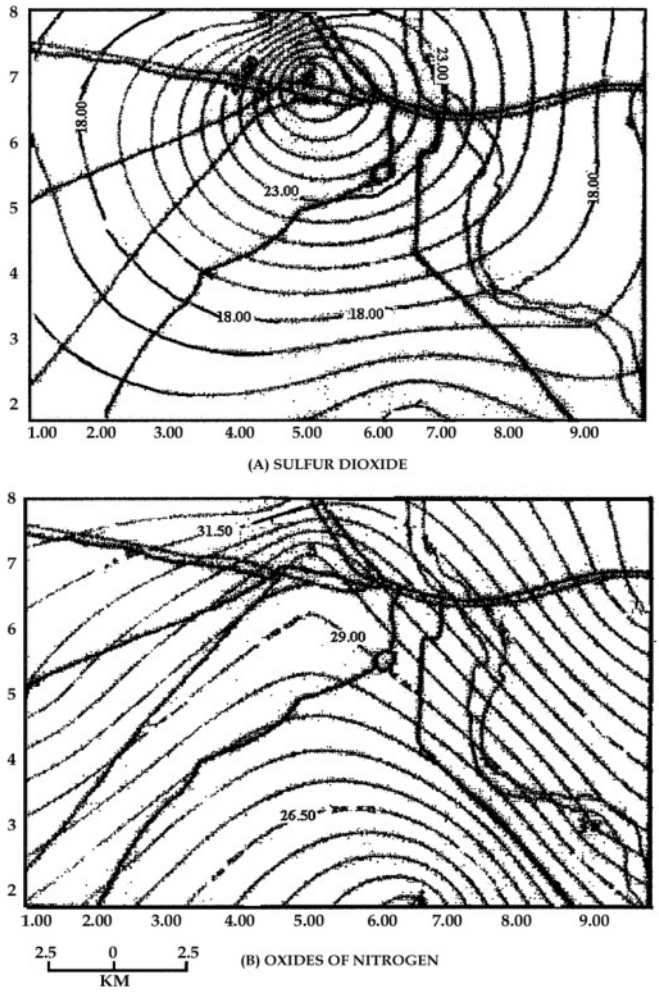


Figure 10-2 Delhi: Concentrations of Ambient Air Quality Measures, 1992.

ANALYSIS AND DISCUSSION

The recording stations are classified according to the predominant function type areas in which they are located. Accordingly the recording stations in Delhi are either industrial or residential areas. The stations in industrial locations are Shahadra, Shahzada Bagh, Siri Fort, Ashok Vihar and Nizamuddin. There is one residential location in Delhi at Janakpuri.

The mean monthly values were plotted on graphs against time for all six locations. The results of this time series analysis are shown in Table 10-1. As can be seen from the values of slope of regression line and that of coefficient of correlation, the temporal trends in the concentrations of SO_2, NO_x and SPM are all positive to different degrees.

Industrial Areas

Sulfur dioxide(SO_2). All the industrial locations of Delhi show an increasing trend in the SO_2 values. Maximum increase is noted at Shahzada Bagh, where intercept is 0.5 mg/m^3 and the trend line rises to about 33 mg/m^3 (slope being 0.389) at the end of the analysis period. The intercept of other locations, i.e. Shahadra, Ashok Vihar, Nizamuddin and Siri Fort, are 9.07, 3.38, 4.94 and 1.1 mg/m^3, respectively. The slope of trend line at these locations is +0.17, +0.23, +0.15 and +0.19, respectively. Maximum increase in the SO_2 levels is observed at Shahzada Bagh where the slope of the line is +0.38. The coefficients of correlation *(r)* range between 0.429 and 0.796, the values of coefficients of determination (r^2) range between 0.184 and 0.633 and that of coefficients of alienation *($Ö(1-r^2)$)* range between 0.903 and 0.606. All *r* values are significant at 0.05% level. These values indicate a fair degree of time dependence, although the role of other factors cannot be ruled out.

Oxides of Nitrogen (NO_x). At all the industrial locations NO_x concentrations show a rise in the values. The intercept of trend line ranges between 5.03 and 22.49 mg/m^3. The maximum increase is found at Nizamuddin where intercept is 5 and value at the end is 39 mg/m^3, slope being 0.413. The lowest value of slope is +0.13. The values of *r* range between 0.47 and 0.80, the values of r^2 are between 0.22 and 0.65 whereas the values of *$Ö(1-r^2)$* range between 0.88 and 0.58, respectively. All *r* values are significant at 0.05% level indicating a greater degree of time dependence.

Suspended Particulate Matter (SPM). High levels of SPM concentration are found at all industrial locations in Delhi. The intercept ranges from 147.7 to 310.7 mg/m^3. The slopes of the regression line range between +0.19 and +3.6, the values of *r*, r^2 and *$Ö(1-r^2)$* range between 0.03 to 0.61, 0.1 to 0.37 and 0.99 to 0.79, respectively. The *r* values for Nizzamuddin, Shahdara and Siri Fort are significant at 0.05% level, but those for Ashok Vihar and Shahzada Bagh are not significant. All the stations show a rising trend in the levels of SPM, but the time dependence is relatively low.

Residential Location

Janakpuri is the only residential location in Delhi. It shows an increase in the levels of all three pollutants

Sulfur dioxide (SO_2). The intercept of the trend line is at 5.47 mg/m^3 and the maximum value is 17.73 mg/m^3 at the end of the analysis period. The slope of the regression line is +0.148 and the values of r, r^2 and Ö(1-r^2) are 0.681 (significant at 0.05% level), 0.46 and 0.73, respectively, indicating moderate degree of time dependence.

Oxides of Nitrogen (NO_x). The value of intercept is 21.52 mg/m^3 and the slope of the regression line is +0.199. The values of r, r^2 and Ö(1-r^2) are 0.76 (significant at 0.05% level), 0.58 and 0.64, respectively, showing thereby a high degree of time dependence.

Suspended Particulate Matter (SPM). The intercept of the regression line is 312.7 mg/m^3 , the slope is +1.328 and values of r, r^2 and Ö(1-r^2) are 0.34 (not significant at 0.05% level), 0.11 and 0.93, respectively, showing poor time dependence.

Spatio-Temporal Trend

The levels of ambient air quality measures, viz. those of SO_2, NO_x , and SPM, for the year 1989 for Delhi are shown in Figure 10-2. An analysis of these maps shows that for all ambient air quality measures the location of S. Bagh has the highest levels. S. Bagh acts as a hub of ambient air pollution. Only for SO_2 is there a secondary peak at Shahdara. The year 1989 shows a slightly changed pattern. The SO_2 levels are highest in the east at Shahdara and near Nizamuddin, and decrease westward. The NO_x peak has shifted from S.Bagh to Ashok Vihar and the values decrease eastward and southward. For SPM the pattern for 1989 has remained more or less the same as that for 1988 with a peak at S. Bagh and values decreasing on all sides. A considerable amount of change is seen in the year 1990. Only in the case of SPM has the pattern of distribution remained unchanged. The SO_2 high at Shahdara has become more accentuated and concentrated, whereas the levels are relatively low in both the south and west. In the case of NO_x no clear peak is discernible, but a decreasing trend from all sides toward Nizamuddin is seen. The highest values are near the north-west corner of the area of study. The concentrations for the year 1991 show patterns which are not very dissimilar to those of 1990. The SO_2 levels are highest in the north-east (Shahdara) and north (Ashok Vihar) and decrease toward the south and south-east. NO_x levels are highest in the north-west and decrease very fast toward the east and south-east. In the case of SPM there are dual peaks at Janakpuri and S.Bagh and the lowest value is at Siri Fort. The concentrations for the year 1992 highlight the primacy of S.Bagh as the air pollution hub of the city in the case of SO_2 and SPM. Only in the case of NO_x is the highest value at Shahdara, decreasing toward Siri Fort. The significance of the S.Bagh-Shahdara axis is highlighted in the maps for the year 1993 (Figure 10-3). SO_2 values are highest at S.Bagh and a ridge of slightly lower values extends toward Shahdara. SO_2 levels decrease toward Siri Fort and Nizamuddin. The NO_x distribution shows more of a multimodal character, with peaks at S.Bagh, Nizamuddin and Janakpuri. A single peak

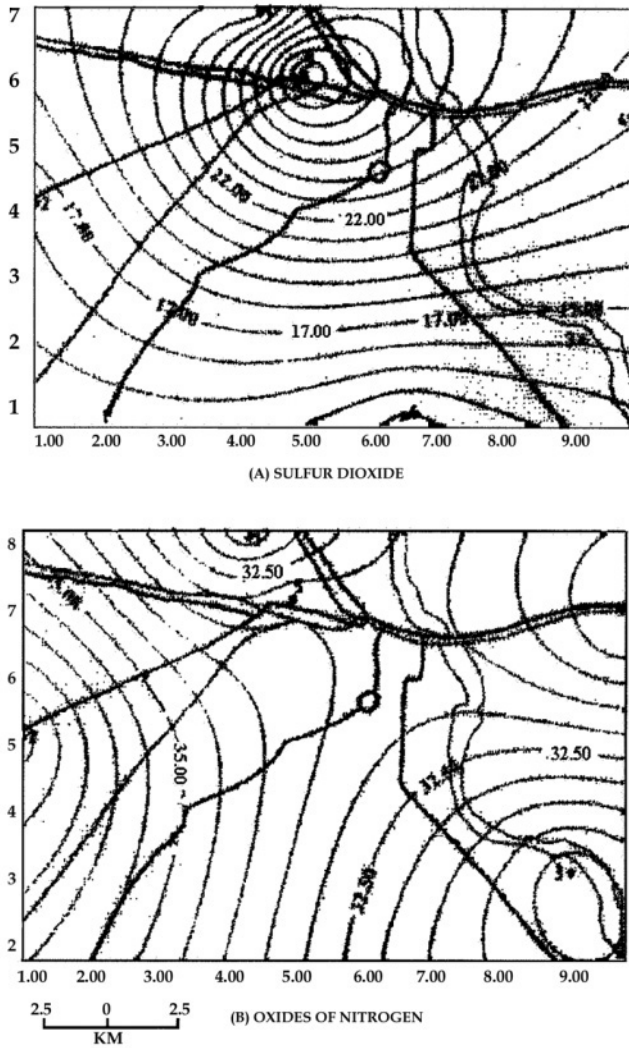


Figure 10-3 Delhi: Concentrations of Ambient Air Quality Measures, 1994.

in the case of SPM is at S. Bagh and the levels decrease steeply northward and rather gently on all other sides. In the year 1994 the pattern of ambient air quality measures seems to be not dissimilar to the other years of analysis. In the case of SO_2 the primacy of S. Bagh is maintained. NO_x and SPM distributions show more than one peak. High NO_x levels at Shahdara and Janakpuri are very conspicuous. Values are low at Ashok Vihar and Nizamuddin. SPM values are highest at Nizamuddin and second highest at Janakpuri. Low values at Siri Fort in the south and Ashok Vihar in the north are noteworthy. Overall it seems the hub of air pollution in Delhi lies at S.Bagh. Other stations with a high propensity for air pollution are Shahdara and Nizamuddin.

It is quite clear from this and from the temporal trends that the concentration of the ambient air pollutants in Delhi has been increasing over the period of analysis. This conclusion is confirmed by many studies conducted by several scholars (Agrawal 1997; Aggarwal 1993; Sharma and Roychowdhury 1996; CSE 1999) who are all in agreement that this dramatic increase can mostly be attributed to uncontrolled industrial growth and phenomenal growth in the number of motor vehicles. According to one estimate (Sharma & Roychowdhury 1996) more than 2000 metric tonnes of pollutants are released into the Delhi atmosphere everyday. This includes 320 metric tonnes of hydrocarbons, 135 metric tonnes of SPM, 323 metric tonnes of NO_x, 179 metric tonnes of SO_2 and 1063 metric tonnes of CO. For SPM the major sources are the general and power generating industries; NO_x are mostly the product of motor vehicles and power generating industries; and the predominant source of SO_2 is the power generating industries. Thus the culprits for the air pollution problem of Delhi are vehicular traffic and industries. Both these sectors need be controlled and hopefully the recent Supreme Court verdict directing the polluting industrial units to move out of Delhi may ameliorate the situation to some extent.

COMPARISON OF VALUES WITH STANDARDS

The yearly standardized scores for different locations in Delhi were compared graphically with each other. The summary of these comparisons is shown in Tables 10-3 and 10-4. The comparison of the recorded values with the CPCB (I) standards does not suggest all that dismal a picture as presented in the media. The values only of SPM concentrations have been higher than the standards in some stations. Tables 10-3 and 10-4 show the distribution of positive Z_{Mi} values for different years of analysis and for different stations. Only one station, Janakpuri, has positive scores consistently during the seven years of analysis. The maximum number of positive scores occurred in 1993 when four stations had positive scores. These positive scores have always been for SPM. All other ambient air quality measures have remained within the CPCB (I) standards. This does not vindicate the ideas presented in media, reports, and the general experience of a visitor to Delhi. This might be attributed to (1) the deliberately higher values of standards (Agarwal & Narain 1999); (2) deliberate location of recording

stations at places where pollution is low anyway; and (3) setting up of the recording instruments at the top of buildings where pollutant concentration is relatively lower.

CONCLUSIONS

It is clear from the above analysis that all locations in Delhi show a positive trend for all three ambient air quality measures for the period of analysis. The rise has been steeper in the case of SO_2 and NO_x, but gentler for SPM. Time dependence, as shown by the values of *r, r^2,* and *Ö(1-r^2),* has been high for SO_2 and NO_x, but low in the case of SPM. The analysis of the spatio-temporal trend points to the northern part of Delhi as being the most polluted part, and to the fact that the levels of pollutant concentration have been increasing over the period of analysis. The comparison of the recorded values of ambient air quality measures with the CPCB(I) standards shows that the level of SPM in Delhi is higher than standards in some locations. But at Janakpuri it is higher in all years under study. This comparison suggests that the air pollution problem is not very serious as mostly the pollutant concentrations are lower than the national standards set by the Central Pollution Control Board of India. This is contrary to the normal belief and experience. It can be attributed to the relatively lax standards. These standards have been kept at much higher values as compared to the WHO guidelines. Thus there is a need to set the standards at lower levels so that by implementing them the air pollutant concentrations can be lowered and the people not exposed to serious health risks.

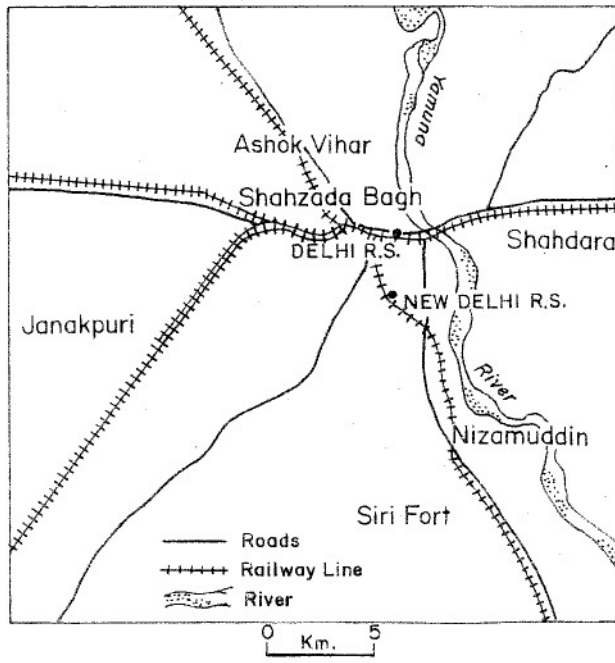


Figure 10-4 Location of Station for Air Quality Measurement.

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CHAPTER 11

ENVIRONMENTAL DEGRADATION AND HEALTH:URBAN GROWTH AND HEALTH RISKS IN PONDICHERRY

THOMAS KRAFFT, ANNE KREMER AND SANDRA SCHRAEDER

Cities are the places where man-made environmental changes occur on the largest scale. Especially in developing countries, environmental degradation and the resulting health hazards have reached an enormous extent (Brandon 1998). In India, urbanization and industrial growth are the key drivers of human-induced environmental change. This is despite the fact that urbanization in India has seemingly advanced less than in other regions of the world. In 1996, only 27.2% of the Indian population lived in cities. The Planning Commission estimates that, by 2006, the share of the urban population will have reached 30.4%, indicating a lower annual urban growth rate than in most other Asian countries. However, India has —similar to China — one of the largest urban systems in the world, with an urban population of 264.1 millions in 1997. Especially towns with more than 100,000 inhabitants are showing a tremendous increase of population. Since many Indian cities have experienced an upgrade from a Principal to a Metropolitan city, the population figures for the latter class show an even more evident growth since 1961. During the last decades, some medium-sized towns such as Guwahati, Aurangabad, Bhubaneswar, Pondicherry, and Thiruvananthapuram have experienced urban growth considerably above the average growth rates of Metropolitan or Principal Cities (Tata Services Limited 1996; Visaria 1997; The World Bank Group 1999; World Health Organization 1999; Government of India 2000).

URBANIZATION AND ENVIRONMENTAL CHANGES

A large body of research exists on urbanization processes in India indicating a positive correlation between the level of urbanization and the occurrence of negative impacts (Agrawal 1997; Cropper et al. 1997; Survey of Urban Health 1997). Despite the magnitude of the problem and the urgent demand to better understand causal links between pollution and health status, there is still a major deficit of studies attempting to systematically evaluate health risks caused by environmental degradation.

The economic growth of India during the last decades has come at a very high price. Between 1980/81 and 1995, the Gross National Product more than doubled. During the same period the real per-capita income grew only by 1.5 times (Tata Services Limited 1996). During the same period, industrial pollution (excluding thermal power plants) also more than doubled, and vehicular pollution almost tripled (Kumar and Bhattacharya 1999). The CSE's estimation of vehicular pollution load took into account data on the number of registered vehicles in India for different categories of vehicles, the daily use of these vehicles, fuel efficiency and emission levels (Kumar and Bhattacharya 1999). Based on projections by the Centre for Science and Environment, an increase of pollutants emitted by vehicles of almost 50% can be expected from CSE to 2001 (Agarwal et al. 1996). Although these figures are widely publicized, policy makers have consistently underscored the health impact and the cost of death or disease caused by environmental degradation.

The severity of the pollution problem is underlined by preliminary findings of the recent Indian Ocean Experiment (INDOEX 2000). The study reveals a dramatic rise of air pollutants by reporting a dense pollution haze, which extends from the ocean surface to 1-3 km altitude. The area affected by this phenomenon includes the northern Indian Ocean and much of the Bay of Bengal. The haze layer is caused by a high concentration of aerosols, primarily composed of soot, sulphates, nitrates, organic particles, fly ash, and mineral dust. It also contains a relatively high concentration of gases, thus giving conclusive evidence that it is caused by pollution. As one of the main sources for the haze layer, pollution related to urbanization and vehicular traffic was identified (INDOEX 2000). In general, this survey provides evidence strengthening the assumption that air pollution caused by urbanization not only leads to direct, local environmental health problems, but also contributes considerably to global environmental change.

Environmental Degradation and Health Risks

Growing population as well as changing consumption patterns create serious bottlenecks in disposing the rising amount of solid waste generated in Indian towns. The common practice of randomly dumping waste along roads or on vacant plots leads to the spread of mosquitoes, flies and rats. Open waste dumps serve as ideal breeding grounds for vermin, and water seeping from dump sites often contaminates surface as well as ground water, leading to health hazards for the population living in neighboring areas. The Central Pollution Control Board (CPCB) estimates that only 13 to 20% of the generated urban waste are being recycled (Tata Energy Research Institute 1998). Due to the changing lifestyle and increasing consumption, more non-biodegradable plastic waste is being generated.

Very often, garbage is simply burned in the streets. Inflaming garbage heaps with high shares of hazardous plastics and other toxic material create a major health risk. Among other pollutants, lead, cadmium, mercury fumes, carbon monoxide, chlorine, vinyl, and chloride are released into the atmosphere, causing respiratory problems,

conditions of pulmonary and cardiac disorders, headaches, coughs, and eye irritations (Agarwal et al. 1999).

Besides the severe environmental health problems caused by solid waste generation, the major source of environmental degradation for many Indian cities is emission caused by motor vehicles. The massive increase in the number of two--stroke vehicles, including two and three-wheelers, is responsible for releasing large quantities of hydrocarbons and carbon monoxide into the atmosphere. Between 1975 and 1995, the number of scooters alone rose from 1 million to 21 million nationwide. In the same period, the share of two-stroke vehicles rose from 42% to a remarkable 73% (Kumar and Bhattacharya 1999). The dramatic rise in the vehicular pollution load also is influenced by an unimpeded increase in diesel consumption. The monitored rise in SPM, NON, and SO_2 especially is caused by diesel emissions. Emitted particles less than 10 microns in size (PM 10) are most harmful to the human health and have been associated with a high incidence of chronic lung disorders. A study conducted by the CPCB shows that in Delhi nearly 40% of the SPM on average is PM 10 or smaller (Agarwal et al 1999). The Indian government has, however, encouraged the use of diesel fuel by substantially subsidizing its price compared to petrol.

Industrialization also acts as a driving force for severe air pollution. Industries, especially in the rapidly growing small-scale sector, do not have adequate pollution control facilities and there is no systematic database on pollution from industrial activities in India (Tata Energy Research Institute 1998). In addition to air pollution (Tata Energy Research Institute 1998; Kumar and Bhattacharya 1999), industrialization also contributes to the degradation of water resources. Even though the agricultural sector consumes by far the largest amount of water, industries are responsible for more than half of the water pollution in India (World Resources Institute et al. 1994). In most cases, industrial effluents are not treated properly or not treated at all. They are discharged into rivers, directly into the ocean, or even into aquifers, thereby contaminating the groundwater with heavy metals such as mercury, chromium, iron and manganese, and chemicals such as fluorides and phenols (Tata Energy Research Institute 1998).

Urbanization and industrialization have added new man-induced health problems to the traditional human health hazards (Stephens 1995; Lampis 1997). Estimates on the impact of air pollution assume that the number of deaths it is responsible for is already 30% higher at the end of l990s than in 1991/1992 (Martin et al. 1998; Bhatt et al. 1999). In addition, respiratory diseases increasingly also are being caused by indoor air pollution, especially among poor people (Martin et al. 1998; World Resources Institute et al. 1998). Roadside dwellers, squatters, and slum inhabitants are most likely to become victims of the synergistic effects of air pollution, indoor air pollution, malnutrition, and lack of basic health care.

The World Bank, in collaboration with the WHO, has introduced a unit of measure for the burden of disease. The unit one DALY (Disability-Adjusted Life Year) corresponds to one year of life lost. The WHO estimates a loss of almost 270 million DALY's in India for the year 1998, which is more than in China (WHO 1998).

Although the symptoms of the environmental health problems are well-known (World Wide Fund for Nature — India 1995; Maddison 1997; World Resources Institute et al. 1998; Agarwal et al. 1999), it has to be mentioned that the current pollution will also have long-term effects that cannot yet be assessed completely (Zemp et al 1999).

URBAN PONDICHERRY: UNCONTROLLED GROWTH

Pondicherry, a medium-sized town on the east coast, south of Chennai, is one of the fastest-growing towns in India. For the decade 1981-1991, Urban Pondicherry showed a population growth of 60%, as compared to Delhi with 51%, Aligarh with 50% or Chandigarh with 36% (Tata Services Limited 1996). The population density of Urban Pondicherry rose from 3.431 persons/km^2 in 1971 to 7.202 persons/km^2 in 1991 (Government of Pondicherry 1971; 1991). For 1991, it was even higher than in Delhi with 6.300 persons/km^2, albeit still less than in Chennai or Mumbai (Tata Services Limited 1996).

During the French period, Pondicherry was a small well-developed town with an appropriate infrastructure. Between 1948 and 1961, the population of Pondicherry District increased from 222,566 to 258,561. Since then, the decadal growth steadily accelerated, with an estimated population of 832,720 for 2001 (Ramadass 1990; Reddy 1999). Given this growth rate - which is considerably high even for Indian standards - Pondicherry serves as a good example for the group of rapidly growing medium-sized towns. The uncontrolled development causes strains on the infrastructure and pressure on the environment: overexploitation of groundwater, untreated disposal of sewage and solid waste, sealing of the soil, and rise of traffic volume.

The overexploitation has already led to a water level decrease and to salt-water intrusion, causing irreversible damage to the alluvial and tertiary aquifers (Reddy 1999). Agricultural land is continuously being converted for industrial, residential, or transport purposes that are damaging the traditional water harvesting systems (Town and Country Planning Department 1997). The site of today's bus stand, for example, used to be a pond, serving as a water collecting tank, fulfilling important functions for groundwater recharge and water storage. The increase of the built-up area leads to flood problems, especially during the monsoon (Public Works Department 2000). Another problem is the increasing solid waste production and the uncontrollable waste disposal. Garbage is often burned on the side of the street, leading to air pollution. Uncollected solid waste often blocks the open drainage system, which then serves as a breeding ground for mosquitoes that constitute one of the major health threats in Pondicherry (Das 1997).

Until the mid-1990s, industrial growth was very little regulated in Pondicherry. As late as l997, was an industrial po1icy established for the first time. By then, considerable damage already had been done. In Pondicherry District, there were 5,676 industrial units, of which 103 belonged to the large- and medium-scale sector (G.O.P. 1997).

Air Quality Status in Urban Pondicherry

The pace of economic growth, in combination with the lack of sufficient air quality management, makes India's medium-sized towns prone to severe air pollution problems. Reliable information on air quality is scarce, and the data available have to be interpreted very cautiously. However, the following interpretation, based on the official data of Pondicherry's air quality monitoring stations, provides at least some rough evidence about the magnitude of the pollution problem and the air quality status. In the industrial area of Mettupalayam Estate, the annual maximum levels of SO_2 and NO_2 have been way above the Indian Standard of 80 Fg/m^3 (Figure 11-1) since 1988, except for 1992. The observed maxima of pollution pose a high threat to the health of those people living near the Industrial Estate. Additionally, the monitored suspended particulate matter (SPM) in the largest industrial state of Urban Pondicherry has been above the WHO recommendations, which suggest a maximum of 90 Fg/m^3, since 1988.

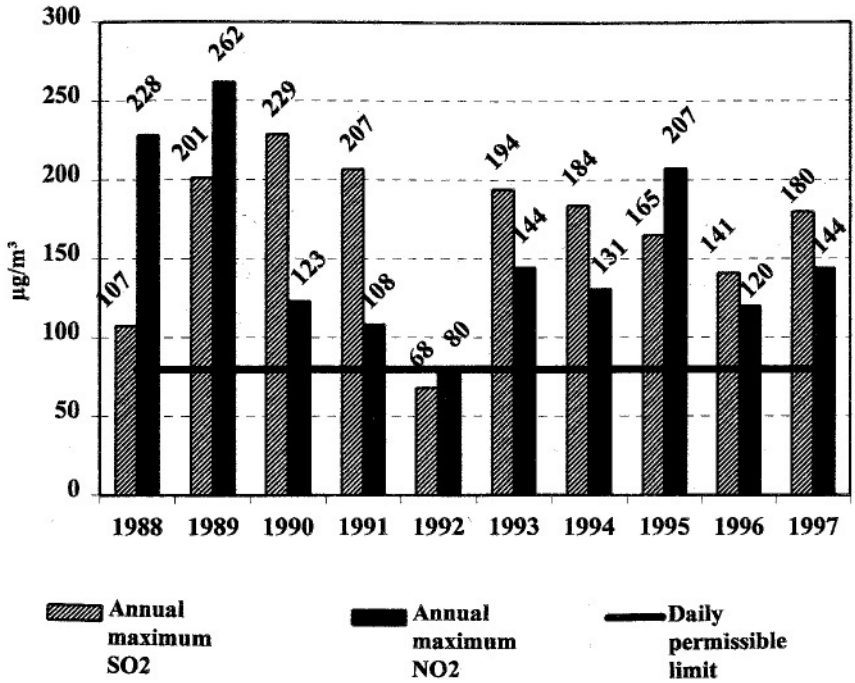


Figure 11-1 Pondicherry: Sulpher Dioxide and Oxides of Nitrogen.

Although Pondicherry appears to be still a 'town of bicycles', it is particularly the rising number of two-stroke two-wheelers that leads to high pollution levels in Pondicherry. Since 1981, the number of the mostly diesel-driven vehicles (four-wheelers and above) has increased by the factor six, whereas the number of two--wheelers

even reached seven times the original quantity (Figure 11-2). Petrol driven two-wheelers emit high levels of carbon monoxide and lead, which can effect the human central nervous system, impair the oxygen-carrying capacity of blood and lead to cancer. The two-stroke vehicles are also responsible for the high emission of the carcinogenic hydrocarbon that, in higher doses, leads to breathing problems, eye irritation, and, in the long term, to impaired lung functions. The exhausts of diesel-driven vehicles are mainly nitrogen oxide and SPM, which can cause breathing problems and asthma. In addition to air pollution, the high traffic volume brings about high noise levels, which not only cause annoyance, but can also lead to auditory effects, concentration problems and sleep interference up to physical disorders and neurosis. The exhaust volume further increases due to the fact that many of the vehicles are very old, and especially the four-wheelers often do not meet the emission standards (G.O.P. 2000a). Congested roads and traffic junctions lead to the consumption of additional fuel, and therefore increase air pollution.

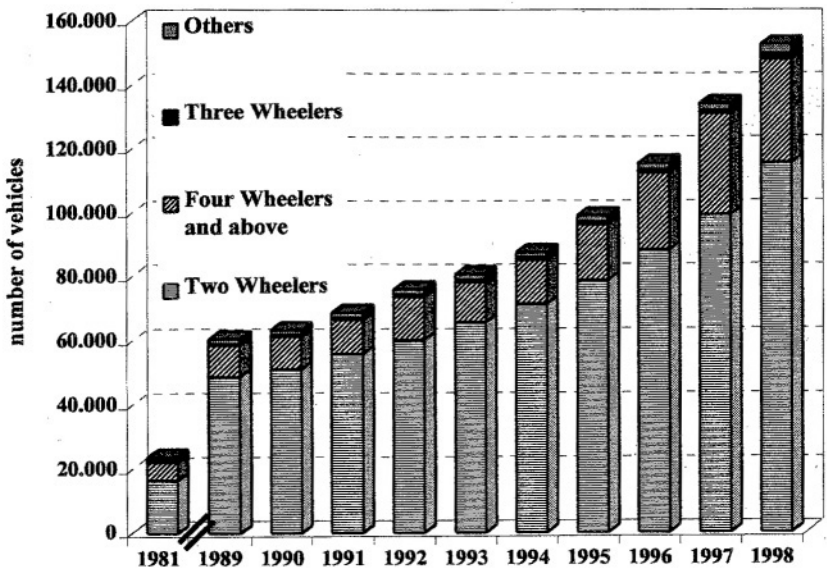


Figure 11-2 Pondicherry: Growth of Motor Vehicles, 1981 - 1998.

In 1995, Pondicherry recorded the highest NO_2 annual average concentration in southern India of 64.1 Fg/rn^3, compared to Delhi with 47 Fg/rn^3. Even though the average SPM levels are lower in South India, a remarkable annual mean SPM concentration of 181 Fg/rn^3 was measured in Pondicherry, which was the highest concentration in South India (Agarwal et al. 1999). Since 1996, the Central Pollution Control Board

classifies the annual mean concentration of SPM in residential areas of Pondicherry as 'critical' (>210 Fg/m^3; CPCB 1999). In 1997, Pondicherry was among the six Indian industrial monitoring stations reporting violation of the mean annual SPM-standard of 360 Fg/rn^3. One of the residential monitoring stations was among the 44 monitoring stations country-wide exceeding the mean annual residential SPM-standard of 140 Fg/rn^3. Considering the 24-hourly SPM concentration, figures of all the three monitoring stations were above the standard (CPCB 1999). One of the residential monitoring stations of Pondicherry was also among the 10 Indian stations exceeding the 24-hourly $N0_2$-standards, and, at the same time, showed the second-highest SO_2-levels among the residential stations in India, although still below the critical level. The monitored NO_2-level of Pondicherry's industrial station was among the highest three in India (CPCB 1999). The accepted air pollution levels in the Indian Air Quality Standards are much higher than the recommended levels of the WHO, indicating that there might be health risks for the affected population even if the concentration of the pollutants is below the Indian Air Quality Standards.

SPM is one of the most serious air pollutants, and even below permissible limits it is still very dangerous to human health. In Pondicherry, it has been above the maximum recommendations of the WHO (90 Fg/rn^3) since 1988 in all monitored areas (Figure 11-3). The highest increase is recorded in the Industrial Estate. There, the SPM level in 1996 was more than three times higher than in 1988, reaching 320 Fg/rn^3. Within only one year, it increased by almost 30% (1995-1996). Even in the residential area, the SPM levels are above the WHO recommendation. The enormous increase of the SPM concentration at the Housing Building can be explained by its vicinity to the bus stand.

RESEARCHING ENVIRONMENTAL HEALTH

Recently new approaches have been suggested to analyze the cause-effect interrelation of environmental degradation in respect to human health (Verhasselt 1997; Phillips et al. 1998). WHO has identified the complexity of the various fields and factors, influencing human health (Figure 11-4). The figure also illustrates that any attempt to comprehensively understand and solve health problems will require input from a multiplicity of scientific disciplines and a sound methodology to integrate these different views and approaches. While methods of environmental/physical sciences help to understand the degree and dynamics of environmental degradation and their physical/biological effects, social sciences have to contribute an analysis of the human dimensions of the observed environmental change.

As part of the environmental health approach, indicators for measuring the influencing factors and the effects within the process are needed. One example is the HEADLAMP project (Health and Environment Analysis for Decision Making Project), which is a collaborative project between the United Nations Environment Program, the United Nations Environmental Protection Agency, and the World Health Organization

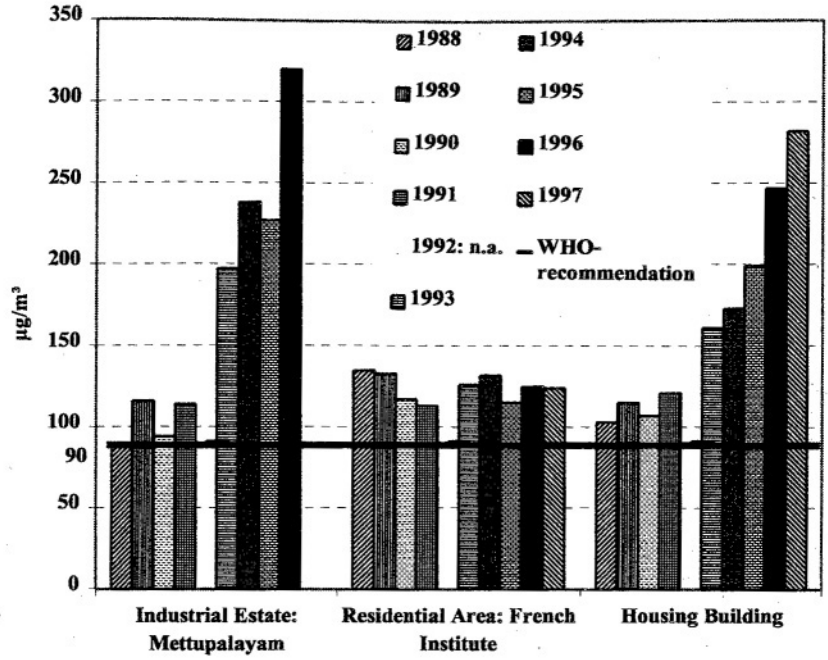


Figure 11-3 Pondicherry: Suspended Particulate Matter, 1988 - 1997.

established in 1993. It aims at making "valid and useful information on the local and national health impacts of environmental hazards available to decision-makers, environmental health professions and local communities" (Corvalán 1996, vii). In context with the HEADLAMP project, a conceptual framework for the development and use of environmental health indicators, the so-called DPSEEA-framework was developed (Figure 11-5). It can be seen as an extension of the pressure-state-response sequence that was initially applied by the Organization for Economic Co-operation and Development, OECD, for environmental reporting. DPSEEA stands for Driving forces, Pressures, State, Exposures, Effects, and Actions to develop environmental health indicators. The further down this causal pathway, the more difficult it gets to acquire relevant data. This means that proxy indicators have to be used (Corvalán 1998).

Within the DPSEEA-concept, relevant driving forces comprise the causes of environmental degradation, like population and industrial growth, and high increase in

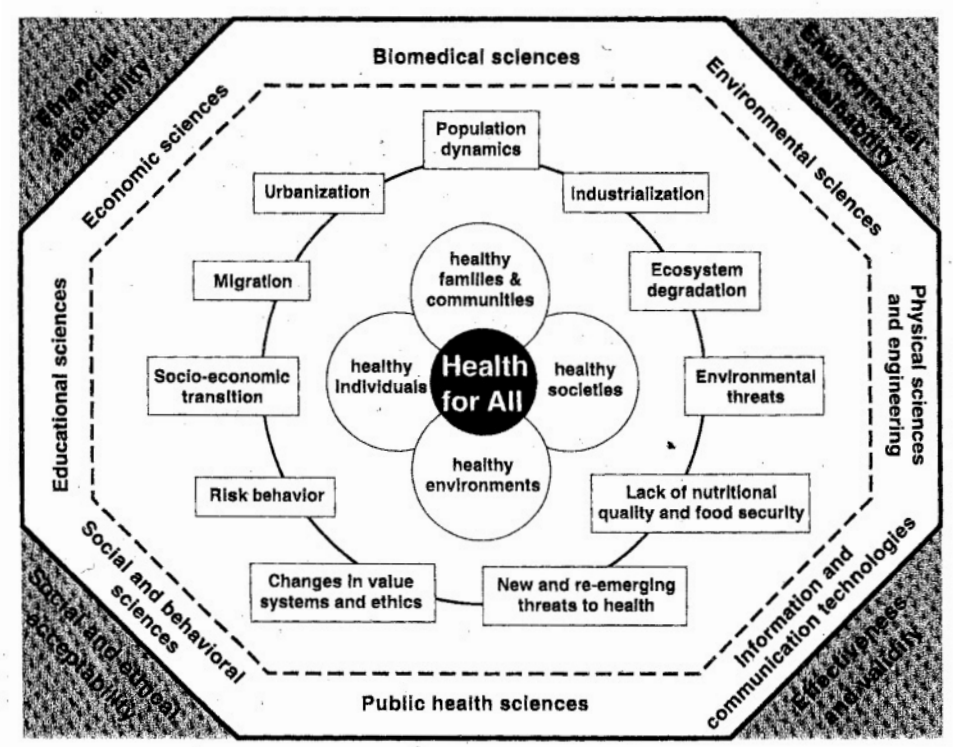


Figure 11-4 Tasks and Challenges for the Scientific Community.

traffic volume. As a result of the driving forces, environmental pressures arise, including vehicular or industrial emissions, unsafe water supply or untreated sewage and solid waste disposal. The environmental response to these pressures can be measured by the level of water pollution, air pollution, and soil degradation. As human exposure to the

various hazards differs by type, intensity, and magnitude, possible health effects of the environmental pressure depend on the vulnerability of human individuals or groups. During this whole dose-response process, action may be taken by individuals, institutions, local or national governments, or society as a whole, to interrupt or influence this process.

Our approach of analyzing environmental and health risk perception corresponds to the state of exposure within the DPSEEA-framework. By identifying vulnerable groups and individuals, knowledge about the collective and individual risk awareness will be gained to form a basis for effective action planning.

Risk Assessment and Risk Perception

Lack of reliable data and limited data access especially in developing countries very often impede a comprehensive quantitative environmental health risk assessment. In addition, the assessment of the actual damage, caused for example by air pollution, is very complex. In theory, data on dose-response relationships can be used for exposure-

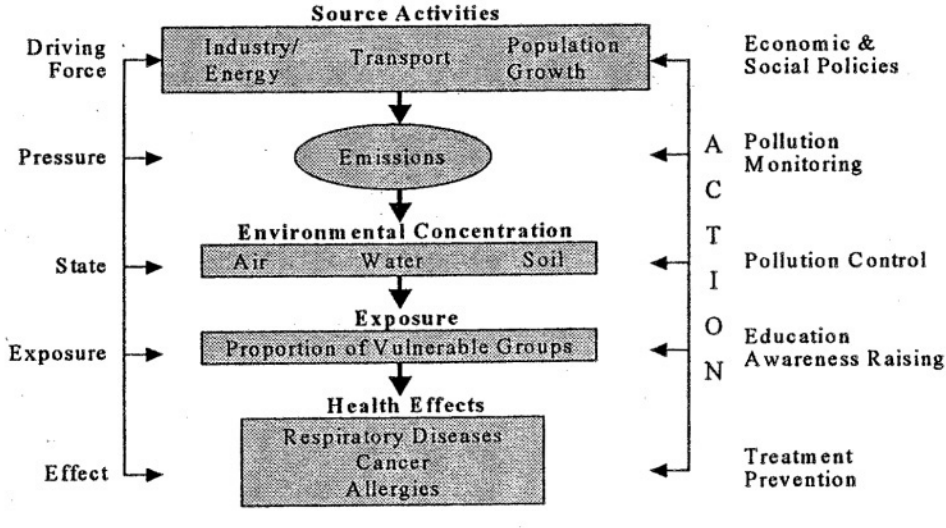


Figure 11-5 Environmental Health Hazard Pathway.

disease occurrence models to identify the impact of different pollutants on the incidence of premature deaths, respiratory hospital admissions, cases of chronic bronchitis, and lower respiratory tract infections in children. However, since exposure to pollution may occur in many different situations and via a range of different pathways, establishing direct causal links appears to be a rather tedious task. Exposure to pollution may be encountered in the general environment, in the occupational environment, or in the domestic environment. The pathways of dispersion vary tremendously, depending upon both the emission source and the pollutant. Rates and patterns of dispersion also depend to a large extent upon the environmental conditions. Exposure patterns therefore are influenced by geographical and temporal variations, which makes the modeling of exposure-disease occurrences rather difficult. Even the identification of high risk areas often involves a number of assumptions. For the research project focusing on environmental degradation and health in Pondicherry, we have decided to combine some elements of environmental risk assessment with an analysis of risk perception to overcome some of the limitations of the risk assessment approach.

The project is divided into three stages. The objective of the first stage is to identify potential environmental health problems for each locality of the city (Figure 11-6). Based on the evaluation of secondary data on socio-demographics, traffic increase, land-use change, industrial growth, water supply, sewage and solid waste disposal, and air pollution, an environmental profile of Urban Pondicherry is created using standard GIS techniques. Sensitive areas (census tracts) affected by environmental health problems will be identified.

The second stage, the focus will be on vulnerable groups and individuals in the identified sensitive areas, examining factors that influence individual risk perception, risk awareness, and adaptation strategies based on interviews and household≤ questionnaires. In addition, the information policies and the decision making process, related to environmental health problems, will also be analyzed in the third stage. The method will be to analyze the risk awareness and information policy of government agencies, institutions, organizations involved in environmental and health matters on local, regional, and national level, based on qualitative interviews.

By combining elements of risk assessment techniques and the methodology of analyzing risk perception, it is intended to get a better understanding of the different processes affecting environmental health in medium-sized towns and to develop a research methodology, which can be applied for other medium-sized towns in India.

CONCLUSION

The determinants of a population's vulnerability to environment related threats to health include the access to material resources, the level of public health and health service infrastructure, the effectiveness of the work of public and civil institutions, the unlimited access to relevant local information, and the kind and severity of diseases that already exist. Vulnerability to environmental health risks is thus determined by both individual and community factors.

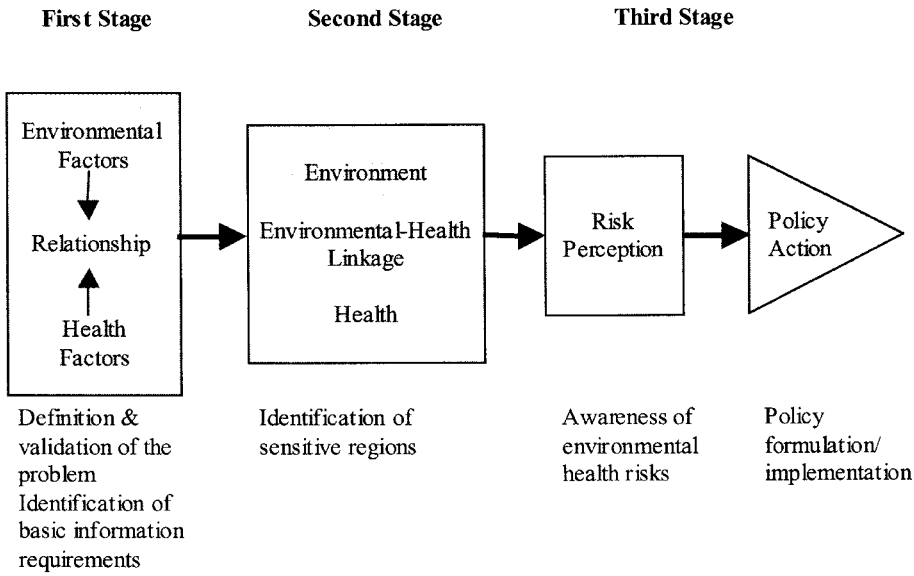


Figure 11-6 Research Process (Source:Corvalian 1996,modified and supplemented).

Understanding a population's capacity to adapt to existing or newly emerging environmental health threats is crucial for any realistic assessment of the potential impacts on health and requirement of any effective prevention strategy. Comprehensive research approaches covering social, economic, environmental, and medical issues of environment related health aspects will help to improve our understanding of complex interdependencies in this field of research.

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CHAPTER 12

POLLUTION PARAMETERS IN ASIAN CITIES

JOHN E. BENHART

Cities are the core of environmental problems. One such problem is air pollution, a diseconomy of urban areas. Although the majority of the population identifies air pollution with the advent of the industrial revolution, such problems have been plaguing cities around the globe for centuries. Air pollution does not emanate only from local sources. The atmosphere has no borders and pollutants can be transported thousands of miles from their point of origin such as a dense urban area to less-dense rural environments (Benhart 1999).

Some of the earliest pollutants were of natural origin including smoke, ash and gases from volcanoes, and forest fires. The expansion of cities and the advancement in technology combined with the increasing population has made the earth's atmosphere change considerably over past years (Urban Areas 1999). However, it has not been until recently that human culture has found air pollution to be extremely detrimental to its health and its environment.

Personal responses to air pollutants rely upon the type of pollutant, how much of the pollutant is present, the degree of exposure, the kinds and levels of individual activity, and age and health status. Generally speaking, the elderly and those with cardiac or respiratory diseases are the more susceptible populations. Health effects may range from difficulty in breathing to aggravation of existing cardiac and respiratory conditions. For sensitive populations, any slight increase in air pollution could make their health problems more severe.

Noise pollution and water pollution are also major environmental issues on a global scale. These two types of pollution combined with air pollution have been the cause of declining human health in many large cities across the globe. Pollution not only impacts human health, but also deteriorates the natural landscape.

This chapter will address some of the different types of pollution that have been harmful to human health and the environment. Air, water, and noise pollution have all contributed to the degradation of the environment and in many cities have become significant environmental management issues. These various types of pollution can cause health problems, such as respiratory illness, birth defects, weakening of immune systems, and digestive problems. Pollution also can have adverse effects on terrestrial and aquatic ecosystems, as well as altering urban ecology in a negative way. Contamination of aquatic ecosystems is particularly harmful if food is harvested and taken from these ecosystems and then consumed by humans.

Cities around the world have been living in the devastating clutch of pollution. This chapter will focus on pollution parameters of three South Asian cities—Hong Kong, Singapore, and Tokyo. Background information on causal factors and on remediation techniques in Asian cities and effects of pollution on their people and their environment will be reviewed.

POLLUTION PROBLEMS IN ASIAN CITIES

Pollution is a concern in Asian cities because it presents various problems that affect all residents and surrounding areas (Karan and Chao 1989; Kidder 1997). The use of leaded petrol, the overabundance of vehicles, the discharge of untreated industrial wastes, the improper disposal of solid waste and sewage, and the discharge of non-point and point source pollution are just a few of the origins of pollution in Asia. Also, the steady rise of sulfur dioxide, nitrogen oxides, ammonia, and ground-level ozone are only augmenting the air pollution issue in Asia (SEI 1999).

East Asia, adjacent to the Sea of Japan, is a region in which international environmental institutions have not yet been instituted. Consequently, the magnitude of air pollution and the problems it is causing has yet to be established. Two explanations for the non-development of a joint monitoring system in East Asia can be attributed to both the confrontation between the East and West during the Cold War and the contrasting economic levels and aims (Ono 1999).

The countries of East Asia over recent years have experienced acid precipitation because of their extraordinary economic growth (annual economic growth of 5-10% in GDP). Coinciding with the remarkable economic growth was a significant increase of air pollutants (highest rate of increase in the world). If there is no movement to implement additional environmental policies, SO_2 emissions could double by 2010 (Ono 1999).

The origins of pollution can be related to poor planning within these large urban centers. In the past, the planners never imagined that the cities would grow to the enormous size they are today, and thus, never planned each city to handle such a large urban population.

Planning

The primary objective of planning is to make decisions about the use of resources within a specific region. The need for land use and environmental planning has been augmented due to the rising competition for sparse land, water, biological and energy resources; the need to protect threatened environments, and the wish to maintain or improve the quality of human life (Marsh 1998).

In Asia and other parts of the world, planning is part of the problem because it is all encompassing of a city's life span. Unfortunately, in Asia the cities were planned for the present-day and not for future growth. For example, a sewer system must be planned in such a manner that allows room for expansion to accommodate an increasing urban population. This is also relevant for solid waste disposal, traffic congestion, and storm

water management.

Although planning is the major issue regarding urban pollution in Asian cities, other issues also are of concern. Urban transportation and industrial pollution are two of the more common problems and are easily linked to the insufficiency of planning. The lack of modern technology to carry out the functioning of a better, more efficient water treatment plant, sewage treatment facility and/or landfills is another problem. Insufficient funding is most often the reason behind the lack of employment of technology.

Urban Transportation in Asia

Asia is a very dynamic geographic region of the world today. The extraordinary economic development and population growth that this region has experienced in the past few decades has created a tremendous growth in vehicle use and ownership. In fact, vehicle emissions are increasingly being acknowledged as the dominant cause of localized pollution (Midgley 1995).

Asia accounts for approximately 10% of the world's automobile numbers and more than 25% of the global truck and bus fleets (Midgley 1995). In Asia, a majority of these vehicles are found in Japan accounting for approximately 70% of this region's automobiles and about 62% of the trucks and buses (Midgley 1995).

The vehicle situation in Asia is creating adverse environmental conditions in many of the countries in this geographic region. The atmosphere is becoming increasingly polluted by vehicle emissions and motorized vehicles are generating intolerable noise levels. Traffic accidents are also claiming more lives. Overall, this increase of vehicle use is creating a more harmful condition for humans and the environment.

Vehicular use has a significant impact on air pollution because a majority of vehicles use leaded petroleum. Burning leaded petrol releases lead and particulates into the air. Particulates can trigger asthma and respiratory infections and are also associated with higher rates of heart attacks, lung cancer, and chronic obstructive pulmonary disease (Poisoned Lands 1997).

Industrial Pollution

Industrial waste is also a primary cause of air pollution in Asian cities. Industrialization creates fundamental new stresses on Asian ecosystems. The rate of industrialization in Asia's cities is three times faster than it was during the industrial revolution in the West (Poisoned Lands 1997).

Industrial pollution is the cause of a great deal of toxins released into the atmosphere and into surface waters. For example, "In Jakarta Bay in Indonesia, where untreated industrial wastes are discharged by some 3,000 small industries such as batik factories, heavy metal accumulation is alarmingly high. In fact, shrimp taken from Jakarta Bay have levels of mercury contamination second only to those of shrimp taken from Minamata Bay in Japan" (Urban Impacts 1998).

The Asian cities discussed in this chapter have recently initiated clean-up programs for their polluted environments. Some of the techniques being employed include

air pollution monitoring in hopes of curbing the emissions through fuel desulfurization, improvements in wastewater treatment plants, and improvements in sewage facilities.

Impacts of Air Pollution

An environment subjected to pollution undergoes various impacts. If sulfur and nitrogen pollutants are emitted to the atmosphere, the concentration of gases and acidic deposition will cause impacts to the local environment. The transport and chemical transformation of these pollutants throughout the atmosphere can also lead to deposition far from the original source. Nitrogen and sulfur compounds lead to the acidification of lakes and soils that in turn have impacts on human health, crop productivity, forest growth, biodiversity, and culturally designed materials (SEI 1999).

Nitrogen and sulfur oxides and pollutants produced through chemical changes in the atmosphere have been linked to respiratory tract irritation and the formation of other diseases, especially in young children and asthmatics. A large portion of the world's population reside in areas where levels of air pollution surpass World Health Organization guidelines (SEI 1999). For instance, pollution episodes may lead to increased hospital admissions and death rates, as witnessed during the smoke haze caused by forest fires burning across Indonesia during September 1997 (SEI 1999).

In addition to damage to forested lands from pollutant gases such as sulfur dioxide, nitrogen dioxide, and ozone, crop yields can be decreased as well. The most significant impacts are found adjacent to the pollutant source because of the high concentrations. However, atmospheric transfer can cause effects over a wide expanse of the earth's surface. Asia's potential for crop loss was confirmed by a study in Pakistan where a forty percent reduction in rice yields was detected and associated with the presence of gaseous pollutants in the ambient air (SEI 1999).

Recently, reports of forest degradation in China and Japan have been linked to the increase of air pollution in Asia. The damage has been associated with sulfur dioxide and ozone concentrations in the air as well as alterations in plant nutrient availability and increases in toxic aluminum in the soil caused by acidification. Acidification is a cumulative process, meaning that the damage from present deposition only becomes evident at a later period. This causes serious impacts on ecosystems that may take decades or centuries to repair. Therefore, it would be advantageous to Asia if they avoid these impacts rather than having to fix them in the future as does North America and Europe (SEI 1999).

THREE CASE STUDIES

Singapore

Singapore, located in Southeast Asia, is both a city and a country. One of the main contributors of air and noise pollution in Singapore is land transportation. Within

the past twenty-five years, Singapore has had great economic growth, which in turn has led to an increase in automobile ownership and use. The automobile is responsible for an estimated 65% of the air pollution in Singapore. Power generation contributes 25% and industry the remaining 10% (Chin 1996).

One of the major problems with this large number and use of automobiles is acute traffic congestion within the city. The severe congestion allows a concentrated level of automobile exhausts to be expelled into the air and contributes to noise pollution. The harmful pollutants include particulate matter, lead, carbon monoxide, sulfur dioxide, nitrogen oxides, hydrocarbons, ozone and toxic substances (Chin 1996). Particulate matter is made up of suspended particles, dust, and smoke. The smoke and smaller particles tend to remain in the air for longer periods of time than larger particles. These particulates are of major concern even though they fall within the United States EPA's standards.

Lead is a byproduct of petrol and if it gets in the bloodstream it can cause mental retardation, particularly in children. Carbon monoxide is contributed mainly through vehicle emissions. Sulfur dioxide is the byproduct of burning fuel-containing sulfur and from oil refineries and sulfuric acid manufacturing plants. Exposure to sulfur dioxide for prolonged periods of time increases the frequency of respiratory diseases (Chin 1996). Nitrogen dioxide comes from burning fuel and vehicle exhaust. All of these substances mentioned have been monitored in Singapore in the 1980s into the early 1990s and have been found to be within the U.S. EPA's limits.

The introduction of unleaded petrol to Singapore drastically reduced the amount of pollutants released into the atmosphere. Also, the compliance with more stringent emission standards on carbon monoxide, hydrocarbons, and nitrogen oxides from vehicles using petrol has been enforced. Singapore has recently implemented a public transportation system to alleviate the traffic congestion in the downtown area as well.

Hong Kong

The city of Hong Kong is located along the coast in southeast China. The city has a history of environmental decay. The region is notorious for beaches laden with industrial debris and polluted waters. Today, pollution is probably the worst facet of life in Hong Kong. Kowloon and the north side of Hong Kong island have high air pollution levels, so much that the west side of Kowloon is sometimes referred to as the "corridor of death" (Moncure 1999).

Hong Kong's rivers often foam from pollution or are purple from industrial dyes, and others are choked with heavy metals from electroplating plants. In addition, some of Hong Kong's waters are polluted by untreated livestock waste. Approximately 25% of Hong Kong's 5.5 million residents suffer from respiratory problems because of the high levels of sulfur dioxide, nitrogen oxides, and particulate matter from vehicles that run on unleaded gasoline (Caruana 1994). Some of Hong Kong's detrimental pollution problems were created because there were delays in introducing and implementing Hong Kong's rapid economic development, which has raced ahead of the provisions of adequate infrastructure (Caruana 1994).

Hong Kong suffers from severe pollution in almost every aspect of its environment, from water to air. Water pollution might be considered one of the most critical pollution problems in the city. Hong Kong still has no suitable sewage treatment system for the majority of sewage released into Victoria harbor (HKEFS 1999). Approximately two million tons of sewage is discharged into the harbor using screening only. Furthermore, numerous sewage pipes in Hong Kong have been illegally linked to storm drains, so that half of all domestic sewage moves directly into the harbour with no treatment whatsoever (Moncure 1999).

Out of forty-three beaches located in Hong Kong, seventeen were rated poor, very poor, or were closed during the 1994-bathing season. Also, the seafood of Hong Kong is badly tainted with two out of six oysters being contaminated with Hepatitis A virus (HKEFS 1999).

As of 1997, the Hong Kong government was constructing Stage 1 of the Strategic Sewage Disposal Scheme (SSDS), which entails pumping sewage from urban areas and treating it at a chemically enhanced primary treatment (CEPT) plant. The plan was completed in 1998. Although this scheme reduces the organic waste, it does not reduce the nutrient load without further treatment. Stage II of SSDS concerning secondary treatment is still in the planning stage (HKEFS 1999).

Air pollution is also of grave importance to Hong Kong. According to a recent lifestyle poll, air pollution is the number one concern among men and women and is the largest source of complaints within the city (HKEFS 1999), although, the air quality of Hong Kong regularly surpasses statutory health standards for air quality. Particulate pollution or total suspended particulates (TSP) and respirable suspended particulates (RSP) are the largest problem. Over 80% of the particulate pollution within Hong Kong's urban area is estimated to come from light diesel vehicles (HKEFS 1999). The annual growth rate of private vehicles in Hong Kong is 10% and even this rate is likely to increase.

Solid waste is yet another concern of Hong Kong. The region produces approximately 8,900 tons of waste daily (1994 data) and is increasing at a rate of 3.6% per annum. Construction waste accounts for 60% of the solid waste generated (HKEFS 1999). Also of concern are the city's three landfills, which are likely only to last 17 years of the expected life span of 40-50 years due to the nine million tons of municipal waste produced each day (Linn 1997).

The ecology of Hong Kong has been detrimentally affected from all of the pollution problems within the area. Hong Kong has a rich flora and fauna, with more tree species than Western Europe and more coral species than the Caribbean (HKEFS 1999). Hong Kong does have 40% of its landmass protected for conservation and recreation as country parks, but the remaining 60% has undergone extreme amounts of stress.

One of Hong Kong's greatest deficiencies is the lack of controls to protect marine and coastal areas. Less than 2% of the Territorial waters are protected as marine parks or reserves (HKEFS 1999). The Chinese white dolphins are critically affected from the pollution. In 1995 and 1996, twenty-one dolphins died out of an estimated population of only 200 (Linn 1997). Rare birds, fish spawning areas, and the nursery

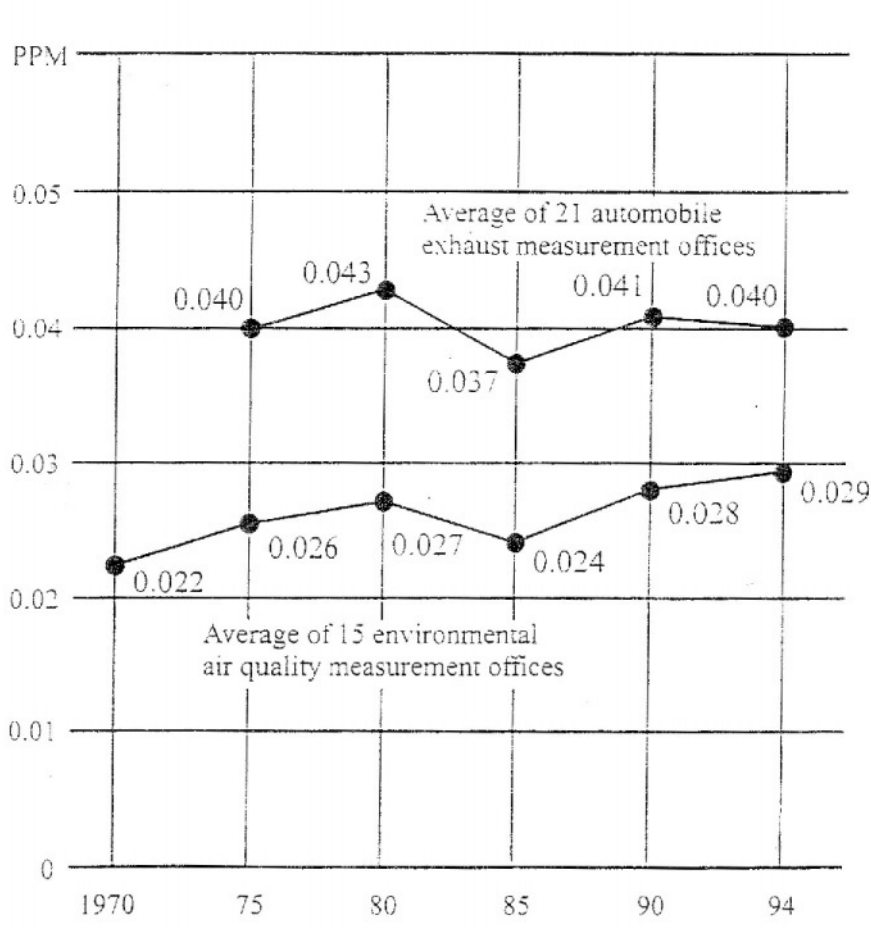


Figure 12-1 Tokyo: Annual Average of Nitrogen Dioxide.

and habitat for the white Chinese dolphins are also in danger of being destroyed by developers planning to follow through with massive development projects (Linn 1997). By these accounts, it is apparent that Hong Kong has many environmental problems associated with a great deal of pollution.

However grave the pollution and environmental degradation, Hong Kong has and is taking action to remediate their environment. First, Hong Kong's government has taken several steps creating legislation that will make polluters pay substantial fines and be subjected to improvement for continued noncompliance. Secondly, the Private Sector Committee Environmental Center and the Hong Kong Productivity Council, two very influential groups, have campaigned for and help fund environmental technology (Caruana 1994). The third action, but the most important, is education. The government of Hong Kong has created a strong academic and environmental engineering program at the newly completed Hong Kong University of Science and Technology (Caruana 1994).

Education is very critical in Hong Kong because the environmental awareness level within the region is not exceptionally high. A recent comparative study performed in thirty-nine countries listed Hong Kong at the bottom in terms of the degree of support for environmental protection, with 56% of people unwilling to pay more taxes to aid in pollution prevention. Nevertheless, a high proportion of the population rate the problems in Hong Kong as urgent or very urgent and that their quality of life has been seriously affected (HKEFS 1999).

As previously stated, manufacturing facilities are a major contributor to Hong Kong's pollution. Hong Kong has approximately 50,000 manufacturing facilities which use a great variety of chemicals in the manufacturing process. Chemicals and dyes are often disposed of untreated. Often times, this chemical waste is mixed with municipal and consumer waste (Caruana 1994). Taking action to remedy the problem, Pacific Waste Management Ltd. has recently finished Asia's first integrated hazardous waste treatment plant on Hong Kong's Tsing Yi Island (Caruana 1994).

Tokyo

Tokyo, Japan is not unlike most other Asian cities, it has problems with pollution that affect its people and the environment. Tokyo, located on Japan's island of Honshu is an area of extremely dense population; approximately 12 million people account for 10% of Japan's total population (Tokyo: Under Control 1994).

Air pollution is Tokyo's major environmental pollution concern. Tokyo is home to a plentiful number of light industrial factories and a very high number of automobiles. The pollution created from these two things creates milky white smog in the air, which is quite unhealthy to humans and the environment.

However, in 1967, the Pollution Countermeasures Basic Law created guidelines to help establish environmental quality standards (Japan Insight 1998). The law also drafted pollution control programs and aided victims who fell ill due to pollution. The "polluter pays" principal was also adopted in the 1970s, which requires a polluting

industry to take financial responsibility for damages caused to the community (Japan Insight 1998).

As aforementioned, automobiles are one of the largest contributors to air pollution within the city of Tokyo. Tokyo's motor vehicle traffic has rapidly increased during the last thirty years. The levels of nitrogen dioxide increased to levels higher than the environmental standard (Figure 12-1). The annual average of carbon monoxide and sulfur dioxide has decreased considerably since the late 1960s and early 1970s (Figures 12-2 and 12-3).

Concerned residents in the urban/suburban areas have become more conscious and aware of the dangers. Therefore, through complaints and concerns for their health and the environment, the government has enforced more strict anti-pollution measures. One action taken was to ban certain types of vehicles from entering the central districts of Tokyo (Japan Insight 1998).

A second measure to reduce the amount of pollution was the monitoring of pollutants in order to gain a better understanding of the extent and damage of each pollutant. The Environment Agency of Japan, which included over 1,000 stations over fifteen regions, set up an air-monitoring network. There are thirty-five stations in Tokyo's metropolitan area, twenty within the city's center and fifteen in the suburbs. Several pollution compounds are measured including: sulfur dioxide, carbon monoxide, suspended particulate matter, nitrogen dioxide, nitric oxide, and photochemical oxidants. This air-monitoring network has helped quantify the great improvements in air quality due to the country's emissions control laws (Tokyo: Under Control 1994).

The introduction of unleaded gasoline in Tokyo was another action taken to reduce pollution. Although measuring lead is not a part of the air-monitoring network, it is known that lead emissions have dropped significantly due to the changeover. Today, more than 95% of all the gasoline in Tokyo is unleaded (Tokyo: Under Control 1994).

Despite the degree of air pollution and its effects on people and the environment, Tokyo has been recognized for having very good air quality for a commercial city with a population of twelve million. Tokyo is also a great example of how air pollution in an industrial megacity can be curbed and brought under control (Tokyo: Under Control 1994). Through the incorporation of the air monitoring network, the changeover from leaded to unleaded gasoline and the regulations promoted by the municipal government for the control of emissions from industries and factories, air pollution has been somewhat reduced.

CONCLUSION

Pollution has caused detrimental problems in both cities and rural areas around the globe. Global air pollution results in acid precipitation, ozone depletion, and the enhancement of the greenhouse effect, all of which lead to environmental degradation

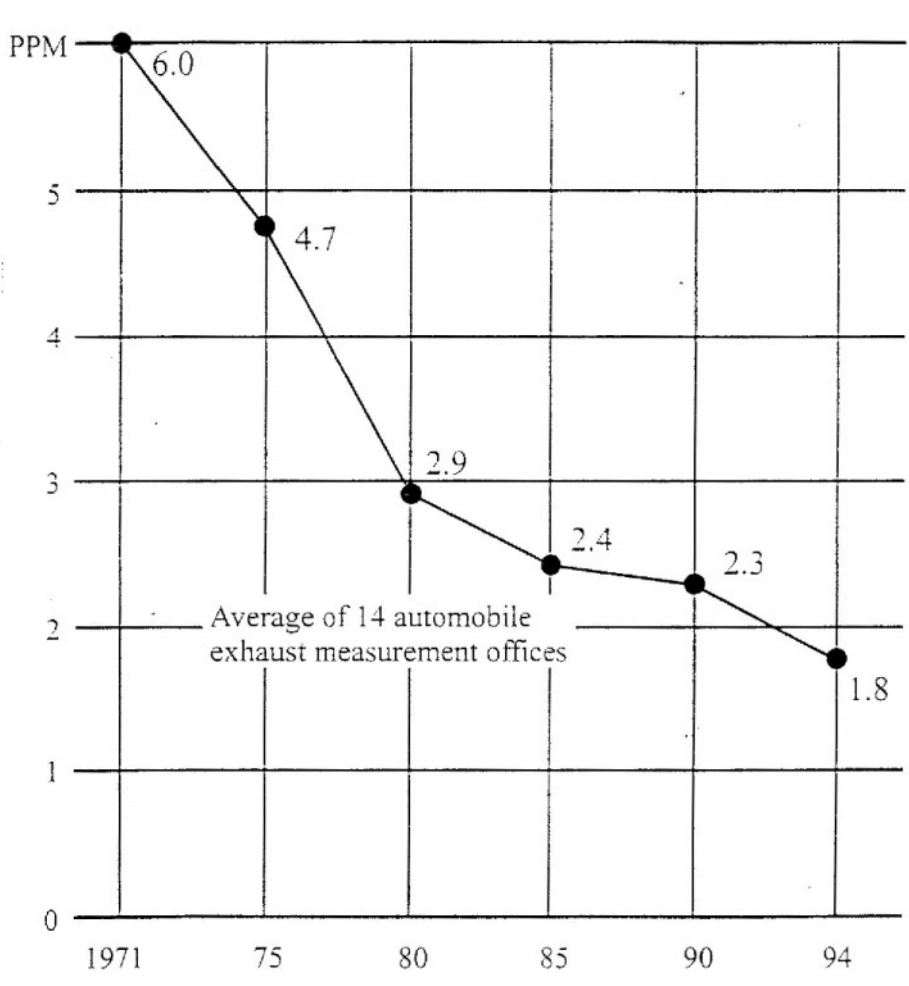


Figure 12-2 Tokyo: Annual Average of Carbon Monoxide.

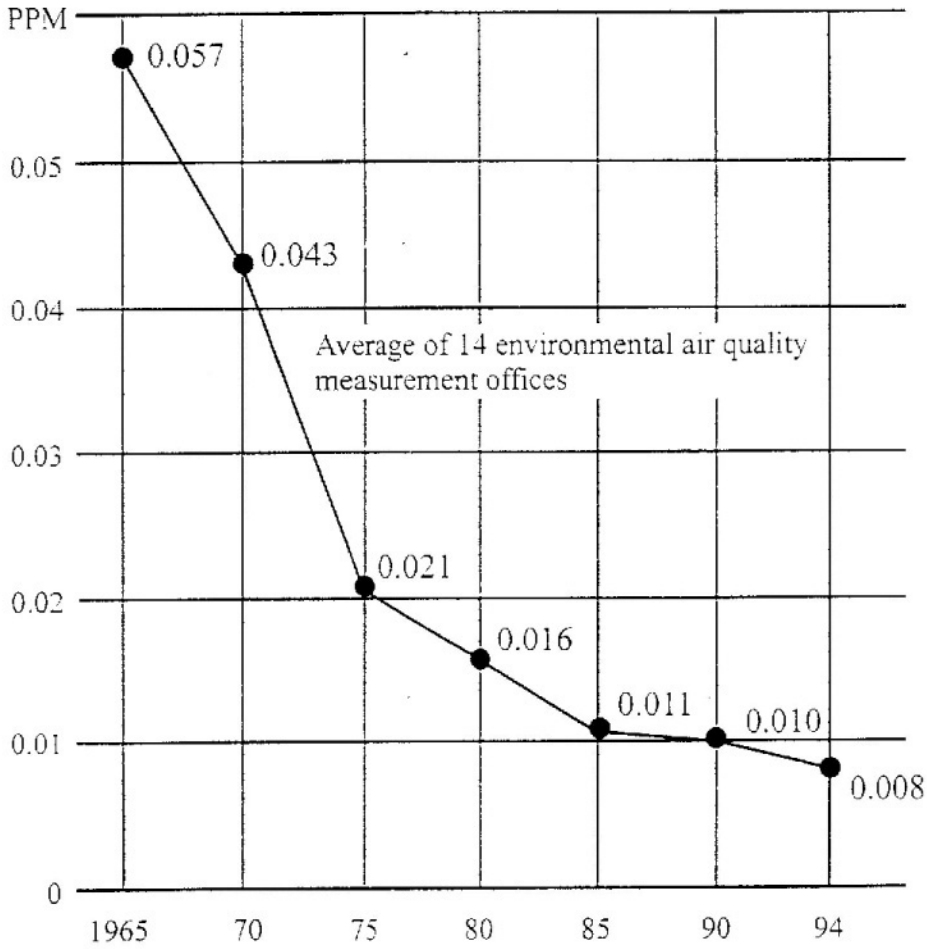


Figure 12-3 Tokyo: Annual Average of Sulfur Dioxide.

on the earth's surface.

The issues explored within this chapter concerning Asian cities indicate that pollution is and has been the cause of declining human health and degradation to the environment. Singapore, Hong Kong, and Tokyo are only three cities out of thousands that are plagued with the pollution problem. The causes of pollution including industrialization, urban/population growth, poor planning, and increasing growth in vehicle use are all items that can be remedied.

These Asian cities demonstrate the need for regional and sub-regional level planning within Asia and the world. Currently, agreements do not exist at this level, nor are any even at the initial planning stages. Policies and infrastructure are presently being planned to decide the emissions standards over the next twenty-five years. Innovative planning at the regional and sub-regional levels presents an opportunity to select an alternative development route to achieve social goals and improve environmental quality. Cooperation at regional and sub-regional levels in Asia would improve environmental planning and create the possibility of avoiding many of the adverse environmental impacts and problems that have plagued North America and Europe for decades (SEI 1999).

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CHAPTER 13

MITIGATING RURAL-URBAN EXODUS:MULTI-OBJECTIVE SPATIAL DESIGN OF RURAL BIOMASS ENERGY

H.D. VENEMA, P.H. CALAMAI, AND K. PONNAMBALAM

Energy supply, a fundamental building block for industrialization, grew rapidly under central Indian government direction through a series of Soviet-style "Five-Year Plans" beginning in 1951. India's power sector expanded from a total installed capacity of 1.7 Giga Watts (GW) in 1951 to 93.2 GW by March 31, 1999 (TERI 1999a). Steel, auto and chemical production rose in lock step driving the rapid formation of urban-industrial metro-poles. The urban population in India rose from 17.3% urban in 1951 to 25.7% by the 1991 census. While the rural population continues to balloon, its average rate of growth since 1951 (1.87%) is far out-stripped by urban growth (3.17%) (GOI 1993). Whether pushed from the villages, by the breakdown of traditional rural societies and agro-ecosystems, or pulled to the cities by the prospect of employment in industry, the urban oasis has, however, proved illusory for tens of millions of abjectly poor rural-urban migrants. The official all-India urban poverty rate is 32.4%, only slightly better than the rural rate (37.3%) (GOI 1998). Measured by international standards the Indian poverty rate is much higher. The World Bank (2000) estimates the Indian poverty rate at 47% at a purchasing power parity (PPP) income threshold of $1 US/day and 87 % at an income threshold of PPP $2 US/day. The urban situation is indeed bleak, according to the New Delhi-based *Centre forScience and Environment* (CSE), "India is facing a total collapse of its urban environment.Most basic services like clean drinking water, sanitation and solid waste disposal are crumbling under increasing population pressure." (CSE 1999, 437).

The current deepening crisis in the Indian energy sector, itself a manifestation of the multiple crises wrought by rapid urbanization, also brings opportunity to re-envision decentralized rural energy as a nexus for integrated sustainable rural development. Sustainable urban development in the Indian context *requires this.* Envisioning stable rural-urban co-existence demands a clear understanding of the relationship between rural energy systems dysfunction and urban migration, and a clear articulation of geographically based socio-ecological design principles for rural energy intervention planning.

CAUSES OF RURAL-URBAN MIGRATION: THE ENERGY LINKAGE

The Economist (2000) describes the Indian power sector as the most dysfunctional in the world: hugely indebted, inefficient and incapable of installing the required generation to keep pace with galloping urban demands. Rural customers meanwhile, endure ever more erratic and low quality supply.

The Failings of "Top-Down" Power

India is, at a village level, 86% electrified. However, the actual rural household penetration of electricity is only just above 30% (TERI 1999a, 270). The over-whelming majority (greater than 99%) of rural electrical energy is consumed as shaft power, primarily for irrigation pumping in the agricultural sector. However the poor reliability of grid energy results in chronic equipment failure, an unwillingness to invest in agro-industrial post-harvest processing, and generally stunted rural socio-economic development *(The Economist* 2000; Ravindranath and Hall 1995). Furthermore, agricultural electricity is unmetered, a legacy of past populist government policy, which encourages profligate waste. Some State Electical Boards, burdened with huge debts resulting from freely supplying the agricultural sector, are unable or unwilling to complete connections to rural households, even in those villages with pre≤existing agricultural connections *(The Hindu* 2000).

The rural electrification process, initiated in the 1960s is incomplete and will not be improved in the foreseeable future by simply expanding conventional centralized energy. Despite ongoing efforts to fully electrify the nation at a village level, the supply situation has not been adequately dealt with. Market liberalization of power supply, a global trend in the 1990s (but extremely contentious in India), is not a panacea for improving rural electrical supply. The World Bank (1996) notes that, "private companies have shown little interest in extending electricity supplies to rural areas", preferring instead to supply urban and industrial loads. In India, the yawning urban/industrial supply-demand gap will absorb the large majority of any new generation capacity (TERI 1999a). Newly electrified villages can look forward only to the same ubiquitous poor quality service.

The rural energy situation in India, and indeed, in most of the developing world is a bottleneck on socio-economic development and only exacerbates rural-urban migration. In a recent report to the Canadian International Development Agency (CIDA), Smallridge and Associates (1999) stated:

> For many of the world's poorest people living in rural and pen-urban areas of developing countries, (energy) holds an important key to breaking out of the poverty trap. A theme, echoed increasingly by both the International Financing Institutions and the developing countries themselves, is that the basic inequity of access to electricity among the poorest people, and the low overall rate of electrflcation is a deterrent to economic and social development.

The same report also documents the historic policy rationale and modalities of rural electrification (RE) in Canada and the USA. The political will to achieve RE in these countries was summoned primarily because, "Universal access to electricity was also recognized as a question of fundamental human rights and as a means of stopping the rural exodus to the cities" (Smallridge 1999, v).

The Destruction of the Traditional Biomass Energy Economy

The poor penetration of electrical energy in rural households, and in the rural Indian economy in general, leaves people reliant on the traditional energy resource, biomass. The total fraction of biomass energy used by rural households for all uses (primarily cooking, space heating and lighting) is generally considered to be well over 90 (Bose *et al* 1991; Ravindranath and Hall 1995; Shankar *et al* 1998). The largest fraction of biomass energy supply (and generally preferred fuel choice) is firewood (56%), followed by animal dung (21%) and crop residues (16%). Kerosene supplies about 9% of total rural primary energy, mostly for lighting.A tiny fraction of rural households (2-3%) have access to or can afford commercial cooking fuels like kerosene or LPG (TERI 1999a).

The continued over-whelming dependence of the rural sector on primitive biomass combustion for primary energy requirements is likely unsustainable and landscape pressure for the procurement of biomass resources, particularly firewood, is acute. India supports 18% and 15% of the global human and livestock potential, respectively, with 2% of the world's landmass, 1% of the world's forest area and 0.5% of the world's pasture land. Per capita forest availability has decreased from 0.2 ha/person to 0.07 ha ($700m^2$) (GOI 1999). The Ministry of Environment and Forests (MoEF) estimates the annual sustainable yield from all forests at 115 million in^3, while the demand is at least 200 million in^3. Furthermore, the MoEF estimates that approximately 270 million livestock regularly graze in forests removing an additional 145 Megatonnes (Mt) and 178 Mt of dry and green fodder, further exacerbating forest degradation (GOI 1999).

Biomass Resource Collapse and Distress Migration

Unsustainable biomass energy procurement is surely not the only cause of deforestation, logging and extension of agricultural land also being primary factors (World Bank 1996). It is, however, a major cause of incremental forest degradation and ultimately loss of biodiversity (D'Silva *et al* 1994; Ravindranath and Hall 1995; Shankar *et al* 1998). Poor access to productive forests also leads to lower quality biomass use (animal dung and crop residue), and underlies a host of ecological and gender-differentiated health and equity issues (Cecelski 1987; Smith 1993).

Mahapatra and Mitchell (1999) describe the effects of decreased accessibility to forests for fuelwood amongst householders in 24 villages in two districts of Orissa. They considered the distance travelled to collect fuelwood as a proxy for scarcity and the effects of deforestation, concluding that the average distance travelled by householders to procure fuelwood was 4.86 km. Mahapatra and Mitchell also report that a startling 43.7% of households in one district and 27.1% of households in a second

district were travelling >8km to procure fuelwood. Cecelski (1987) generalizes the sadly all-too- common situation reported by Mahapatra and Mitchell as three-stage rural socio-ecological collapse, culminating in rural-urban exodus as the biomass resource collapses. In Stage 1, the local ecosystem can still be characterized as biomass rich, and varied local employment stems out-migration. In Stage 2, loss of tree cover and decreased fodder availability signal the onset of socio-ecological disequilibria. The labor burden of collecting fuelwood increases. The use of lower quality residual fuels such as animal dung, and male out-migration both begin. In Stage 3, topsoil is seriously depleted and vegetative cover disappears. Households rely on animal dung, agricultural residues and what little commercial energy is available. Distress migration is common.

STOPPING THE URBAN CRISIS - CREATING SUSTAINABLE RURAL ECONOMIES

A vexing question remains: where to focus scarce development resources? "End-of-pipe", mitigating abject urban poverty, or tackling the problem at the root: dysfunctional rural economies stunted by their access to both modern and traditional energy forms.

Decentralized Energy and Forestry Management

This chapter advocates a re-conceptualization of rural energy as the nexus for integrated rural development, indeed a modernization of the Gandhian notion of village-based development. Dismissed in past decades as utopian or "uneconomic", a decentralized development path based on the sustainable utilization of locally available renewable resources re-emerges as an eminently practical policy response to pressing local and global sustainability concerns. Intelligently designed rural energy systems can mitigate the worst effects of deforestation, landscape degradation and biodiversity loss associated with subsistence, low-efficiency biomass energy use. Sustainable use of locally available renewable energy also produces no net Greenhouse Gas (GHGs) associated with climate change (Ravindranath and Hall 1995). A convergence of recent successes in community-based forest management, technological advances in biomass energy conversion, and enabling international policy driven by climate change concerns provide the cornerstones for envisioning integrated rural energy systems design. Indeed these conceptual components provide the economic and ecological rationale to operationalize a resolution to the "fuelwood problem" (World Bank 1996) in a holistic manner, as part of the larger issue of energy supply, poverty alleviation and the protection of natural resources in rural areas.

Clearly, afforestation is central to rural development, "trees must be grown on a massive scale to prevent the growing ecological imbalance" (CSE 1989). Indeed one of the very few bright spots in the last decade of Indian environmental management is the afforestation of degraded common lands through community-based management known as Joint Forest Management (JFM). Successful JFM projects, notably Sukhomajri vil-

lage in the state of Haryana and Jhabu district in Madhya Pradesh, demonstrate that communities can improve the ecological resilience of their local landscape, increase food, fodder and fuel production and even improve biodiversity, if they are allowed a maximum of self-governance and control over the regenerated resource (Sarin 1995 a and b; Singh and Varalakshmi 1998a; CSE 1999). JFM is without question a historic policy shift towards democratic, decentralized resource management in India, and its successes should be celebrated. JFM in and of itself, does not however ensure equitable access to resources (Sarin 1995b), nor does it address the next basic human development objective — moving up "the energy ladder" to higher quality energy forms such as electricity. Nonetheless, as a conceptual component of decentralized, biomass-based rural energy systems planning, JFM is essential.

Linking Forestry, Rural Electrification and Climate Change Mitigation

High efficiency conversion of biomass to electrical energy through a gasification-combustion process is a very promising technology with wide applicability for decentralized rural power, and is the second key conceptual component of integrated rural energy design. The basic conversion technology has been known for decades, poor reliability has, however, delayed wide-scale field deployment. This may soon change—sustained research and development in biomass gasifiers has succeeded in demonstrating robust designs well suited for rural power applications (Ravindranath and Hall 1995; Khosla 1999). Rural biomass power installations can potentially provide the economic rationale for JFM-style afforestation programs to provide the requisite gasifier feedstock.The up-front investment costs remain onerous for developing country rural applications — fortunately a multi-lateral investment source is evolving.

The Clean Development Mechanism (CDM), proposed under the auspices of the United Nations Framework Convention on Climate Change (UNFCC), enables developing countries to sell Greenhouse Gas Emissions credits to emitters of GHGs in the developed world who are obliged to reduce emissions under the terms of the Kyoto protocol. In principle, afforestation, which sequesters atmospheric CO_2. and biomass gasification, which reduces fossil-fuel dependency are eligible investment vehicles under the CDM. DESI Power Pvt. (India), a not-for-profit agency, currently manages the installation and operation of six village-based biomass gasifiers, financed by the Dutch Government through the CDM. DESI has demonstrated in three years of operational experience that introducing reliable biomass energy will stimulate artisanal industry and employment (Khosla 1999).

In practice however, the linkage between rural energy development and afforestation programs remains weak. Despite the firmly established relationship between forest accessibility, forest degradation and rural energy use, implementing agencies have in the past been unwilling or unable to couple both energy supply and afforestation objectives (Agarwal 1989; Ravindranath and Hall 1995; Mahaptra and Mitchell 1999). There exists also, a conceptual resistance among traditional foresters to the idea that forests can be sustainably harvested for energy extraction, though the World Bank (1996) claims this too is changing and cites several examples in Kenya and India where farm-

ers have autonomously implemented agro-forestry systems as a response to local demand for wood, improving their local ecology in the process.

In general, however, the poor integration of energy and forestry policy in developing countries stems in no small part from their inherent geographic complexity. The World Bank (1996) describes the "misdiagnosis" of traditional rural energy as an energy sector problem, rather than more accurately perceiving it as one aspect of multipurpose landuse. Successfully tackling the geographic complexity of rural energy requires new and creative design perspectives. Shukla (1996) describes the huge potential payoff resulting from locational optimization of infrastructure, landuse planning, decentralization, and major penetration of renewable energy that could lead to a very low resource and emissions intensive economy, while sustaining a much higher level of development. A huge challenge arises, however in that these interventions are effectively intractable to conventional top-down energy sector analysis.

METHODOLOGY

This chapter introduces the use of modern geomatics technology (remote sensing, geographic information systems) and design principles based on location optimization and landscape ecology to tackle the multi-objective geographic complexity of rural energy planning. The design process assumes that the fundamental intervention objectives are: (1) Improved accessibility to biomass resources (Mahapatra and Mitchell 1999), and (2) Ecologically sustainable designs of the biomass resource supply within the larger landscape context (CSE 1989; Pachauri 1993).

A pre-requisite to the design process is a JFM-style participatory rural extension program engaging the target rural population. The assumed outcomes of this process are (a) an expression of community willingness to participate in a JFM-style afforestation program and (b) a cadastral survey of the landscape, supplemented by remote sensing analysis, indicating the location of all villages, the existing forest structure, and locations identified as appropriate for afforestation. Identifying priority afforestation areas should also consider improved watershed management, for example, by targeting high-risk erosion zones. Figure 13-1 illustrates a schematic representation of the results of such a survey. Operations Research literature as the *p-median problem* (Love *et al* 1988), wherein the objective is to improve the total accessibility of the biomass resource by reducing travel distances between the village and the resource. Mahapatra and Mitchell (1999) provide the rationale for this design criterion choice by clearly stating that *"the distance travelled to collect fuelwood can be taken as a proxy for scarcity and the effects of deforestation."* The afforested zone's required size is proportional to the sustainable yield requirements for forest products, including biomass for energy supply, which is a function of the number of villages that will access the resource. Figure 13-2 illustrates a schematic framework of such an accessibility-based design, which ignores the existing forest structure present on the landscape and seeks only to improve (by minimizing) this total distance criterion.

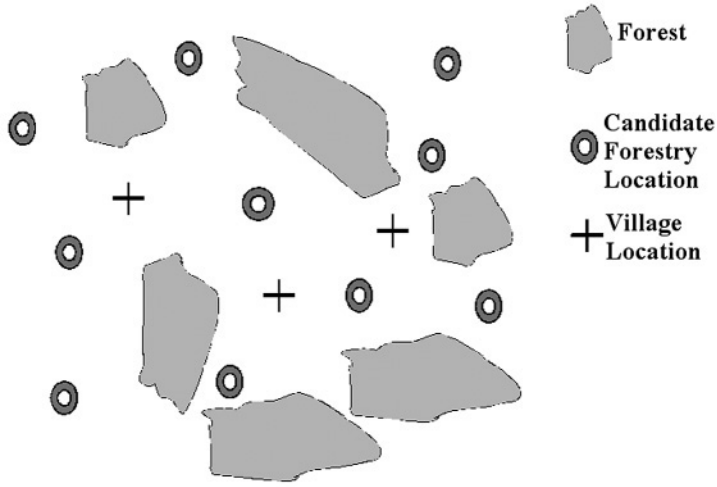


Figure 13-1 Schematic Cadastral Survey.

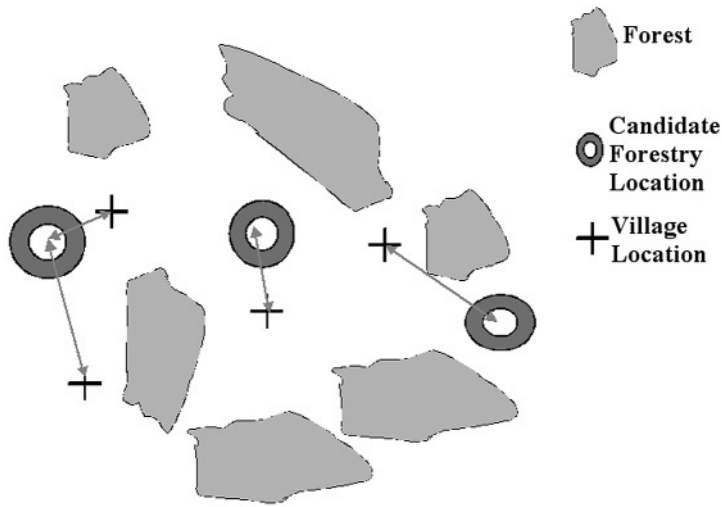


Figure 13-2 Schematic Improved Biomass Accessibility.

Sustainable Design of the Biomass Resource

Ensuring the sustainability of the biomass resource within the landscape context is not readily formulated as a variant of a classical operations research or location science problem. The problem is instead conceived as a *Landscape Ecology* design problem, wherein the afforestation program should enhance the total ecological integrity of the existing forest. Landscape ecology provides a theoretical foundation for understanding the forest mosaic as ecological process and structure, and significantly, provides tools for measuring the degree of forest fragmentation (Forman 1995). Mitigating forest fragmentation is increasingly recognized as critical for halting bio-diversity loss (Franklin 1996). Indeed, the modern consensus in Conservation Biology and Systems Ecology believes that species-specific conservation schemes are futile if the larger issue of habitat destruction is not addressed (Noss et al. 1995; Jennings 1995).

India is endowed with 7% of the total global biodiversity according to the Indian Ministry of Environment and Forestry (MoEI), yet this invaluable resource is under unrelenting stress. Menon and Bawa (1997) document the extent of forest fragmentation in the Western Ghats of southern India, by measuring the fragmentation and isolation of forest fragments using remote sensing and GIS-based quantitative landscape ecology. The severe threat to biodiversity conservation that Menon and Bawa describe is unfortunately ubiquitous in India. The MoEF estimates that 42% of India's forests have already been degraded. Mitigating the underlying process driving biodiversity loss, the continued loss and fragmentation of existing forest cover is a stated objective of MoEF's National Forestry Action Programme (GOI 1999) and can be closely coupled to community level biomass energy planning. Figure 13-3 illustrates a framework of an afforestation scheme to minimize forest fragmentation.

APPLICATION: THE SHIVALIK HILLS STUDY AREA

We apply spatial design principles to a rural energy planning exercise in a semi-mountainous region, The Shivalik Hills, of Haryana state in northern India. The Shivaliks range over about 20 000 km^2 through the states of Punjab, Haryana and Himachal Pradesh, lying in the sub-montane ecological zone of the Himalayan foothills. The region is characterized by erratic rainfall, extremes in temperature, and unreliable hydrology. Hence, maintenance of vegetative cover to mitigate erosion risk is essential. Figure 13-4 shows the location of Haryana and the Shivaliks.

Historical and Socio-Ecological Context

Historically, the Shivaliks supported dense forest. Beginning in 1806, however, British administrators managed the Shivalik forests for large timber extraction for the Royal Navy. In 1822 the hillsides were divided among the villages, and the subsequent forest clearing for cultivation and intensified grazing resulted frequently in severe degradation of the Hills ecosystem. In 1916, a traveller, Patrick Fagan, remarked that the Shivaliks were "as barren as the mountains of the moon" (cited in Singh and Varalakshmi 1998a,27).

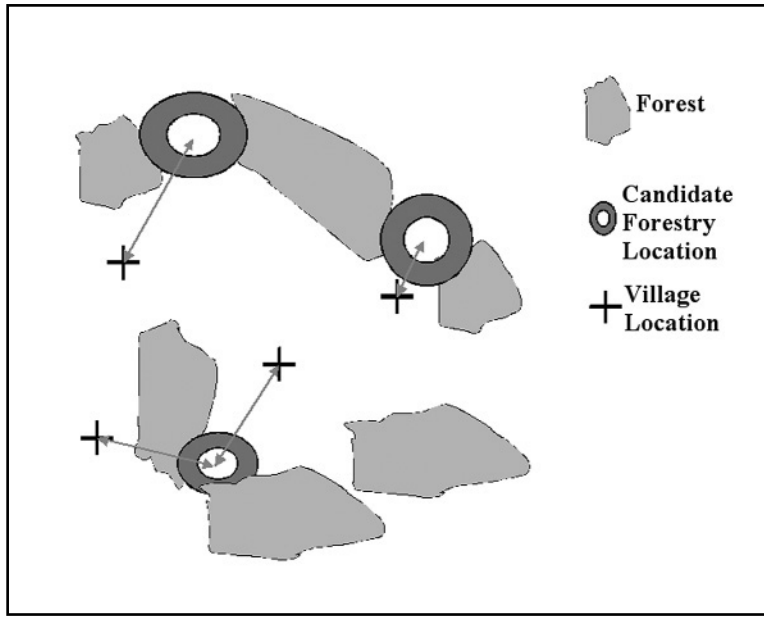


Figure 13-3 Schematic Minimized Forest Fragmentation.

The Punjab Land Preservation Act (1900), intended to abate ongoing landscape degradation in the Hills ecosystem, entailed the closure of fragile areas to open grazing, forbade the lopping of trees, and annulled traditional rights of pasture, wood-cutting and conversion of forest lands for cultivation. The Act was largely ineffective, serving only to escalate tensions between the Forest Department and the Hill communities. In 1939, the Ambala Soil Conservation Division, a special branch of the Forest Department, was established to enact programs to control soil erosion and restore vegetation. The Soil Conservation Division initiated the first attempt at participatory resource management in the Hills. Government policy focused on attempting to coerce the people into accepting voluntary forest closure. By 1942 the Government resorted to compulsory forest closure, again inciting conflicts with the Hill communities over usufruct access rights for fuel, fodder and pasturage.

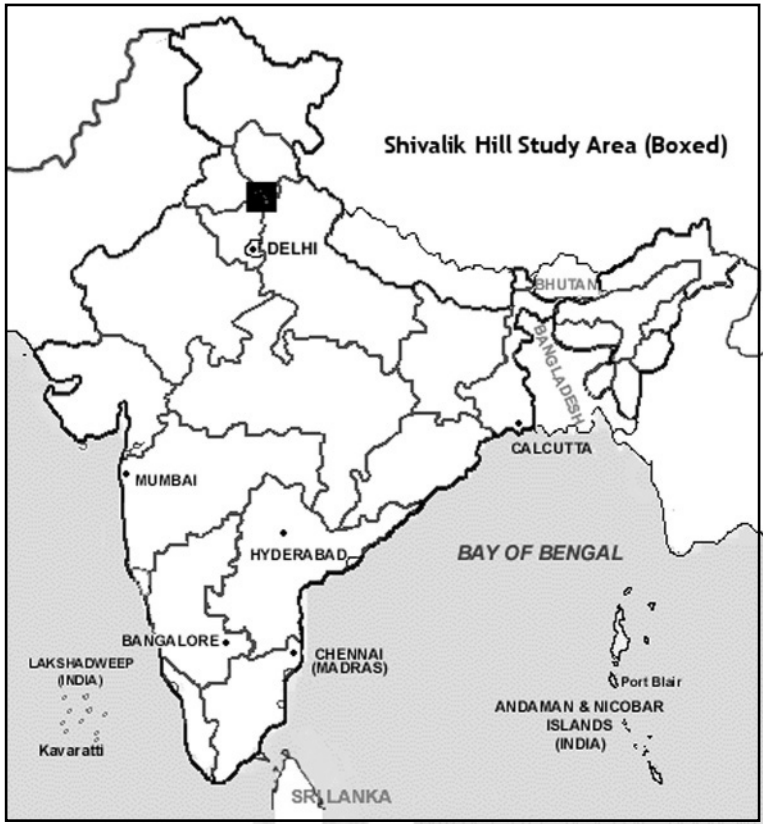


Figure 13-4 Shivalik Hills Study Area.

In the 1970s, the Sukhna Lake catchment in the Shivaliks experienced extremely high siltation rates underlining the severity of landscape degradation in the region and motivating another concerted effort at participatory forest management (Singh and Varalakshmi 1998a). The Chandigarh Centre of Central Soil and Water Conservation Research and Training Institute and the Haryana Forest Department (HFD) pioneered participatory watershed rehabilitation techniques. Water-harvesting methods in the Sukhomajri watershed (and later replicated at Nada village) proved so successful in raising agricultural productivity that community confidence and interest in forest protection measures also could be sustained.

Sukhomajiri is an internationally recognized success story in community-based natural resource management - between 1976 and 1992 average tree density rose from 13 to 1272 per hectare (CSE 1999). Singh and Valarakshmi attribute the success of the

Sukhomajiri experience to the HFD's recognition that increased forest productivity *had to be shared with the villages.* Sukhomajiri demonstrates that communities can succeed in breaking a vicious cycle of ecological and socio-economic impoverishment. Among the most notable successes at Sukhomajiri is the advent *of Hill Resource Management Societies* (HRMS), community institutions designed to delineate responsibilities and distribute benefits of ecosystem regeneration.

The HFD has since attempted to replicate the successes of Sukhomajri and Nada in 39 Shivalik village. However, only 20% of the target villages have managed to establish HRMS's and secure benefit-sharing agreements with the Forest Department. Singh and Valarakshmi (1998a) report that the cooperative spirit evident in Sukhomajri and Nada has been conspicuously absent and that the inability to successfully replicate previous successes stems largely from a poor definition of community rights and responsibilities and the absence of a clear policy regarding benefit-sharing.

Current Shivalik Land Resource Status

The current forest status in the Haryana portion of the Shivalik Hills is shown in Figure 13-5. The forestry information is derived from multi-spectral imagery acquired by the IRS lB LISS -II satellite system (imagery acquisition date: April 5 and 6, 1999; sensor resolution: 36.2 meters). The imagery covers a 2091 km^2 region districts of Ambala, Panchkula, and Yamunanagar. The border with Himachal Pradesh defines the northern boundary of the study area. The region's most notable feature is the very small amount of non-degraded forest remaining on the landscape. The landscape planning process focuses on these remaining forest fragments as the "ecological nuclei", providing the basis for afforestation systems planning.

Spatial Decomposition

For institutional and computational tractability, the landscape design process requires a spatial decomposition of the entire region into smaller planning units. The concept of the *Spatial Energy Catchment* is introduced and is based on the notion that an energy demand centroid (defined as the population weighted centroid of a village cluster) exerts a radial zone of influence that defines the geographic region from which the village centroid can economically acquire biomass. Voronoi polygons describe such zones of influence and are defined by mapping the regions that contains all locations closer to its centroid than any other centroid. (Okabe *et al* 1992). Many varied fields: molecular physics, astrophysics, materials science, biochemistry, geology, ecology, and archaeology, all of which require some definition of point pattern regions of influence, apply Voronoi analysis. The Voronoi description is practical for systems that rely strongly on biomass. A fundamental process in such systems will be the flow of biomass along shortest path distances towards the energy demand centroid, irrespective of watershed or jurisdictional boundaries (Joshi and Sinha 1993).

Current biomass energy systems planning implicitly recognizes the spatial zone of influence governing biomass flow. In a biomass resource study in Haryana for the Indian Ministry of Non-Conventional Energy Sources, TERI (1999b) remarked on the

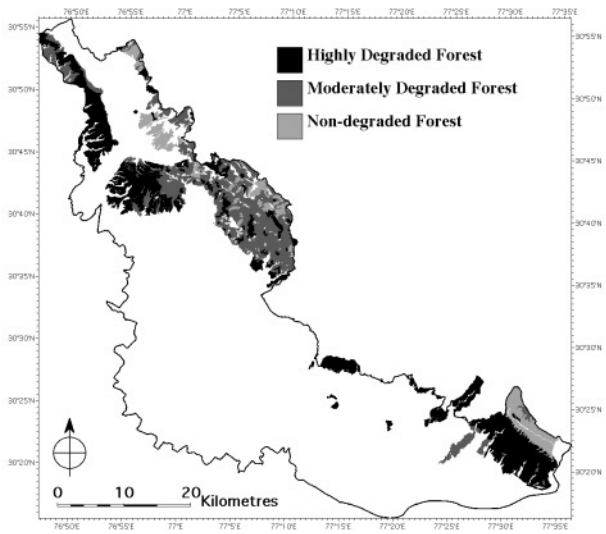


Figure 13-5 Haryana Shivaliks: Forest Status.

artificiality of imposed political jurisdiction (block) boundaries on the resource assessment, "an informal market exists in the area, which operates much beyond the study area to bring in the biomass." In a similar study in a hilly region of Arunchal Pradesh, TERI (1999c) assumed a radial zone of influence (15-20km) on biomass supply for a proposed 1 MW rural power project. The spatial generalization of these radial "zones of influence" is in fact a *spatial tesselation* (Okabe *et al* 1992) which generates Voronoi polygons. This concept has not yet entered the rural energy literature or rural energy planning practice. A *k-means* clustering algorithm (Griffith and Amrahien 1997), based on the size and location of villages (not shown in Figure 13-5) within the greater study area is used to identify demand centroid locations. Figure 13-6 illustrates the resulting spatial tesselation and highlights the region-of-interest, and the remaining non-degraded forest fragments within it. The region-of-interest was extracted for detailed design, which straddles the districts of Panchkula and Ambala, and is known locally as the Morni Hills. The Morni Hills catchment contains some of the few remaining non-degraded forest fragments in the entire greater study area. The people of the Shivaliks are also significantly more dependant on fuelwood than the rest of Haryana (TERI 1999a). The Morni Hills catchment will be used to illustrate the essential bioinass system design concepts.

Accessibility Design

The p-median accessibility problem is constructed by generating candidate afforestation zones from the patches of degraded forests, and generating demand points at

the centroids of the villages. The afforestation zones will be the locations from which the communities will acquire their biomass energy supply. In practice, selecting candidate zones for afforestation should be closely coupled with watershed development planning, ideally using GIS based analysis. Figure 13-7 illustrates the village-supply allocations for the p-median solutions, the p=3, 5 and 7 cases, and shows the improvement in the total accessibility (measured as a decrease in population-weighted distance), and the average biomass supply distance. The average biomass supply distance is related to the total accessibility and decreases as the accessibility improves, but is not weighted by the population of individual villages. The existing non-degraded forest is shown in the p-median solutions for perspective. The p-median algorithm attempts to minimize the population-weighted distance (the total accessibility) by optimally selecting candidate afforestation sites. Selecting the best candidate supply zones by brute-force enumeration of possibilities is computationally intractable even for relatively small problems such as these (forty candidate afforestation sites), requiring the evaluation of 54 thousand, 79 million and 94 billion different scenarios for the p=3, 5 and 7 cases respectively. A modem and flexible approach to solve combinatorial problems such as the p-median problem is through the use of "genetic algorithms" and is the approach adopted for this analysis.

The p-median solutions shown in Figure 13-7 indicate that villages will effectively share the forest resource. The "real-world" practicality of such designs can only be evaluated through field extension. In many cases, socio-cultural divisions between villages will preclude cooperative resource management. However, as Singh and Valarakshmi (1998b) note, the socio-cultural divisions between villages may be no more acute than within villages, yet JFM success stories indicate that with clear definition of rights and responsibilities such differences can be surmounted. Furthermore, Singh and Valarakshmi (1998b, 48) recommend that when demarcating the forests falling under the protection and jurisdiction of local JFM Resource Management Societies (such as the HRMS's in the Shivaliks), "neighbouring villages which have traditionally been using the same forest area must be consulted'. Singh and Valarakshmi indicate that cooperative forest use is not only possible, it is historically the rule. Clear and equitable demarcation of forest access rights to the same forest is essential for cooperative forest management. Singh and Valarakshmi (1998b, 40) in fact, advocate engaging all neighboring stake-holders in defining access rights, "conflicts over access between neighbouring villages to the same forest resource may be lessened if both villages participate in the protection and regeneration of presently degraded forest, cultivating a sense of joint ownership."

Landscape Impact of Afforestation Biomass Energy Supply Programs

The accessibility-based design methodology addresses only the issue of improved access to domestic biomass energy supplies. The landscape impact of forests managed by the community for both domestic and commercial energy will also be significant and an important design consideration. Ecologically sustainable forest management practice typically assumes that no more than the Mean Annual Increment (MAT) is harvestable

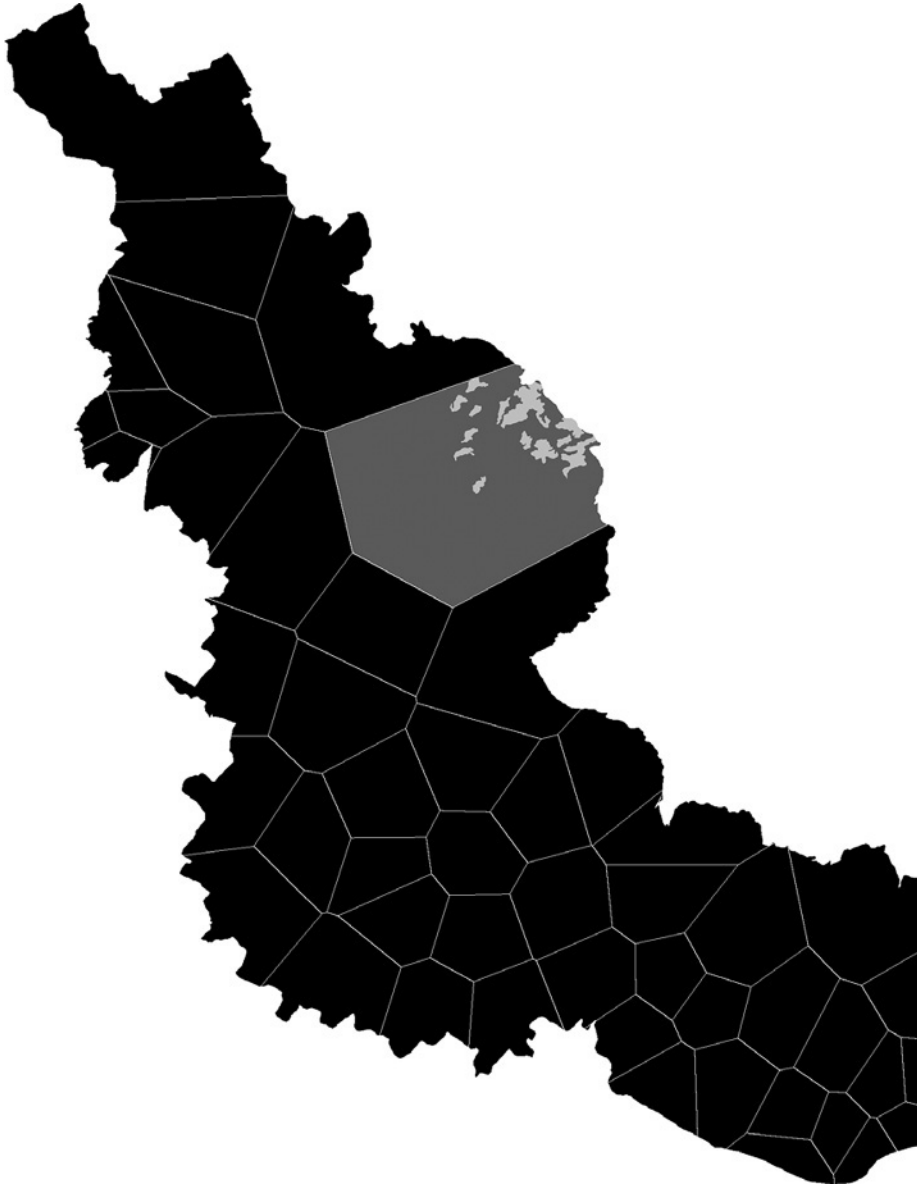


Figure 13-6 Haryana Shivaliks: Spatial Tesselation.

in a given year. The MAT is defined as biomass growth (in tonnes/hectare) as a percentage of the standing forest biomass stock (tonnes/hectare). The MAI varies as a function of species type, climatic zone, soil and hydrological conditions and forest health. Some generalizations are possible however, for natural forests of mixed species the MAT will range from 1-2%, while the MAT for managed plantation forest will range from 2-4% (Shankar *et al* 1998). For the Shivalik case, the following assumptions are used: a standing biomass growing stock of 160 tonnes/hectare and an MAT of 2%, resulting in a net sustainable wood supply of 3.2 tonnes/hectare/year.

The landscape impact of afforestation programmes will be a function of both the forest productivity and the demand for fuelwood. The typical rural biomass energy demand pattern in Ambala and Yamunanagar Districts, all-Haryana and all-India is shown in Figure 13-8. Figure 13-9 shows three landscape impact cases (p=5) relative to the existing non-degraded forest: **i.** a basic woodfuel demand of 200kg/capita/annum, **ii.** 200kg plus 100 kWh/capita/annum electrical energy, and **iii.** 200kg plus 200 kWh electrical energy through a rural biomass-gasification scheme. The assumed wood energy content is 30 GJ/tonne and total conversion efficiency is 30% (Craig and Mann 1997). The large spatial impact in the last two cases is in part attributable to an assumed 50% ecological reserve requirement, but would be large even without it. The reserve requirement allows forest harvest for electrical energy from only 50% of the total growing area, which is intended as "insurance" for ecological sustainability. The reserve requirement is similar in concept to the Multiple-Use-Module in Conservation Biology planning, wherein an inner forest core area is restricted and multiple uses, including energy harvest in this case, are permitted in the outer forest zones (Noss 1987).

Biomass Energy and Landscape Ecology

Rural electrification schemes based on community forest management and biomass gasification will, evidently, exert a large landscape impact even at very modest electrical energy demand levels. The impact on the local ecosystem and local biodiversity will be significant, and generally positive, particularly if sound landscape design principles are followed (Paine *et al* 1996; Bell 1994). Hall and House (1995) caution against the use of inonoculture energy forestry plantations, acknowledging that several decades of experience in social forestry clearly indicates that monoculture plantations are both socially and ecologically deleterious. Bell (1994, 57) stresses the need to integrate the energy harvesting regions smoothly within the existing forest structure, "tying them into the landscape." Bell also advocates the use of curvilinear, rather than rectilinear, forest features, an ecological design principle usually attributed to Diamond's (1975) original studies in island biogeography wherein he argued that a circular shape provides the most dispersal opportunities for species, thus minimizing local extinctions. Apart from these largely qualitative design criteria, scant literature exists on formal landscape design principles for biomass energy system planning. The quantitative revolution in Landscape Ecology, however, provides modern analytical tools to formalize the design process.

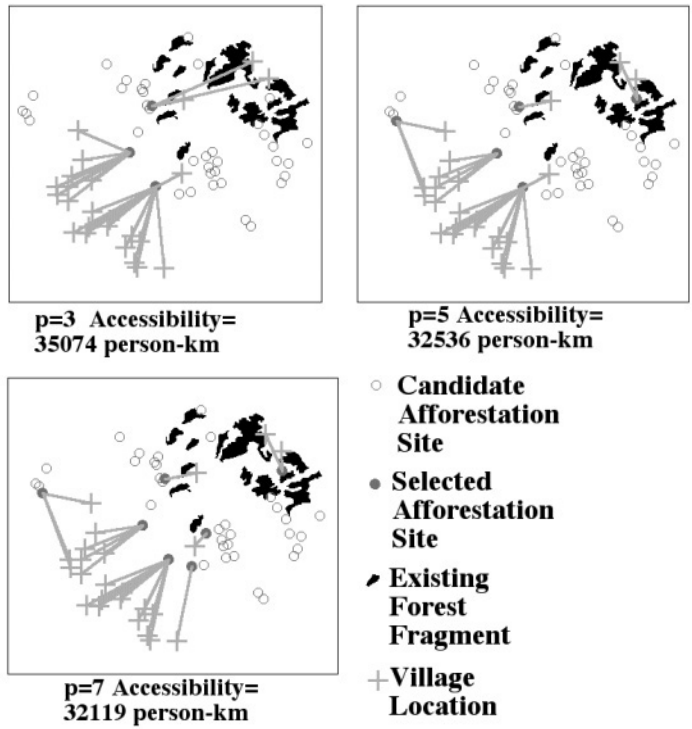
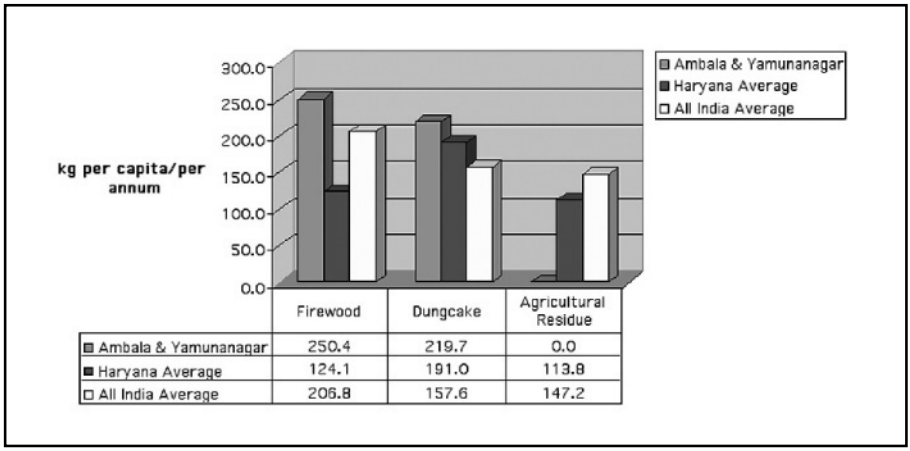


Figure 13-7 *p*-median Optimization Results.

Quantitative Landscape Ecology is revolutionizing Forest Management, contributing new spatially-based concepts, which in essence, relate forest ecosystem health to the spatial configuration of forest patches on the landscape. The first generally available suite of Landscape Ecology indicators, *Fragstats* (Marks and McGarigal 1994) provided forest planners with a consistent set of measurements for analyzing increasingly ubiquitous, remotely sensed forest data. Forest planners could now manage (and in principle, optimally design) forests to minimize fragmentation, which has increasingly identified as the underlying cause of habitat and biodiversity loss.

The biomass energy-landscape design process demonstrated in the Shivalik Hills focuses on the Mean Proximity Indicator (MPI), one of several dozen *Fragstats* indicators documented by Marks and McGarigal (1994). Alternative Landscape Ecology indicators, such as the Perimeter/Area (P/A) ratio used by Menon and Bawa (1997) in their biodiversity conservation planning exercise in the Western Ghats, are equally valid.The MPI is a strong indicator of the degree of forest fragmentation, increasing as forest patches become less isolated and their distribution less fragmented (Marks and McGarigal 1994). The MPI (dimensionless) is defined for a particular land class such



	Firewood	Dungcake	Agricultural Residue
Ambala & Yamunanagar	250.4	219.7	0.0
Haryana Average	124.1	191.0	113.8
All India Average	206.8	157.6	147.2

Figure 13-8 Biomass Energy Consumption.

as forest,as: $MPI(d) = \frac{\sum_{j=1}^{n} \sum_{s=1}^{n} \frac{a_{js}}{h^2_{js}}}{n}$, where a_j is the area of the j[th] patch of forest and *s* denotes all patches other forest patches within a threshold distance, d of the j[th] patch, h_{js} is the edge-to-edge distance between patches and *n* is the total number of patches on the landscape. The MPI thus increases as both the average patch size increases and the average proximity of patches increases. The threshold distance, *d,* in this case is set to a large value so the entire landscape is considered in all analyses.

Participatory Multi-objective Landscape Design

Two competing objectives for community-managed afforestation design have thus been defined. A design optimized for accessibility will tend to disperse the forest resource base, while a landscape ecology-based design will tend to maximize the compactness of the forest. Multi-objective analysis (Jannsen 1992) can help formalize the process of selecting between alternative designs. The genetic algorithm, spatial optimization (accessibility) and landscape ecology evaluation modules were all implemented as linked routines in the Matlab™ programming environment (MathWorks 2000). The genetic algorithm evaluated candidate solutions ranked according to the priority weighting of their accessibility and MPI scores and preferentially selected the best solutions to generate new candidate solutions.

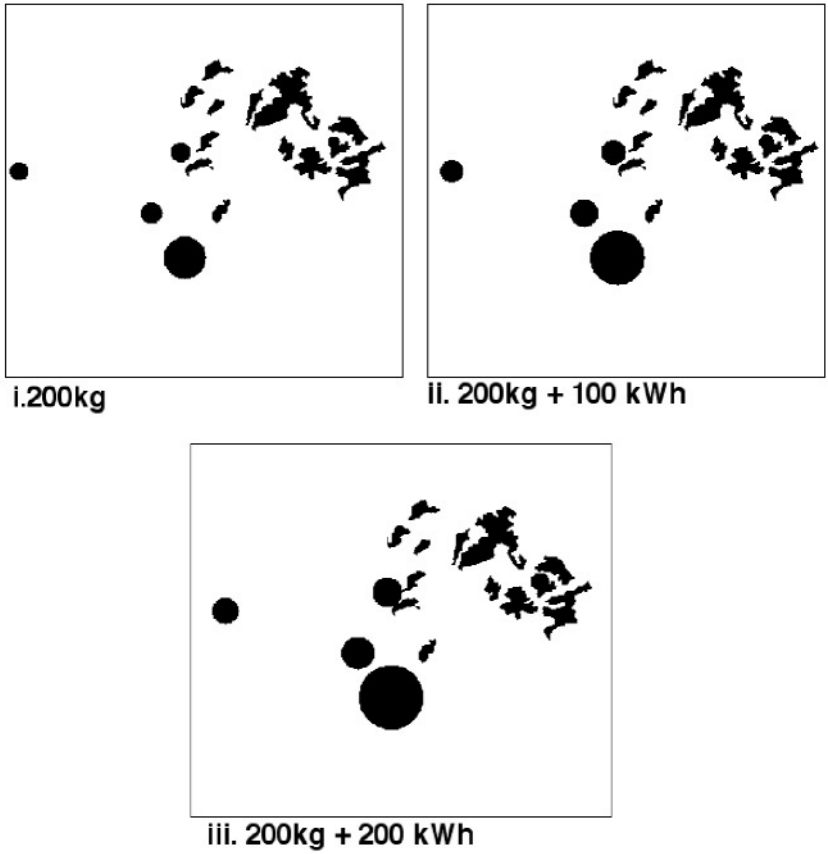


Figure 13-9 Landscape Design: Spatial Impact.

Figure 13-10 illustrates four alternative landscape designs ranging from 100% priority weighting on accessibility maximization (total weighted distance minimization) to 100% priority weighting on landscape ecology (MPI) maximization. All cases illustrate the landscape impact of an afforestation design to sustainably supply per capita demands of 200kg wood and 200 kWh electrical energy and show the euclidean (straight-line) accessibility distance. Design iv is clearly unacceptable as accessibility is greatly compromised in order to maximize forest compactness. Design i is a poor candidate design as well, because Design ii and iii provide a large gain in MPI with little penalty in total accessibility. The appropriate design decision in this case would likely be to explore other scenarios between ii and iv in consultation with the affected communities.

The multi-objective analysis formalizes and rationalizes the complex evaluation process of the socio-economic and socio-ecological issues inherent in rural energy design. The design process illustrated here, however, can not be considered complete without extensive community participation in defining objectives and choosing between alternative designs. Decades of experience in social and community forestry indicate participatory methods are the only path to project success.

CONCLUSION

The prospects for sustainable urban development in India will remain remote until the rural-urban exodus is effectively mitigated by sustainable rural development. The destruction of the biomass-based rural economy is the underlying cause of rural economy dysfunction and subsequent urban systems malaise. Poor access to biomass energy, on-going ecosystem degradation, and very low penetration of modern energy systems, characterize the landscape, the ecology, and the economy of rural India. A renewed vision for integrated rural development must therefore start with re-vitalizing rural biomass-based energy economies. Community-based forest management and high-efficiency conversion of biomass to electricity form the basis for this new integrated rural development vision. Forest systems managed for energy will exert a large landscape impact, the design of which will therefore require detailed geographical analysis. A case study in the Shivalik Hills (Haryana, India) demonstrates a new forest planning approach utilizing remote sensing, geographic information systems, and design principles derived from spatial optimization and landscape ecology. The multi-objective analysis framework illustrated can assist community—based forest planning and management in maximizing socio-economic and ecological benefits. Community-based forest management (JFM), is indeed one of the few success stories in rural environmental management in India, and one of the few hopes for reversing the exodus of "ecological refugees" to cities:

> The best result of all these projects is that they have either totally stopped or greatly reduced distress migration from the villages. In other words, greening India's villages has a great potential to reduce the immense pressures that exist on the country's urban centres in the form of slums and exploitative labour conditions (Agarwal 1999, 29).

Enhanced JFM planning for basic human development and ecosystem objectives such as high quality energy provision and improved biodiversity should be at the center of integrated rural development policy. The authors hope that this research makes a conceptual and analytical contribution to understanding this new rural planning paradigm.

Acknowledgments

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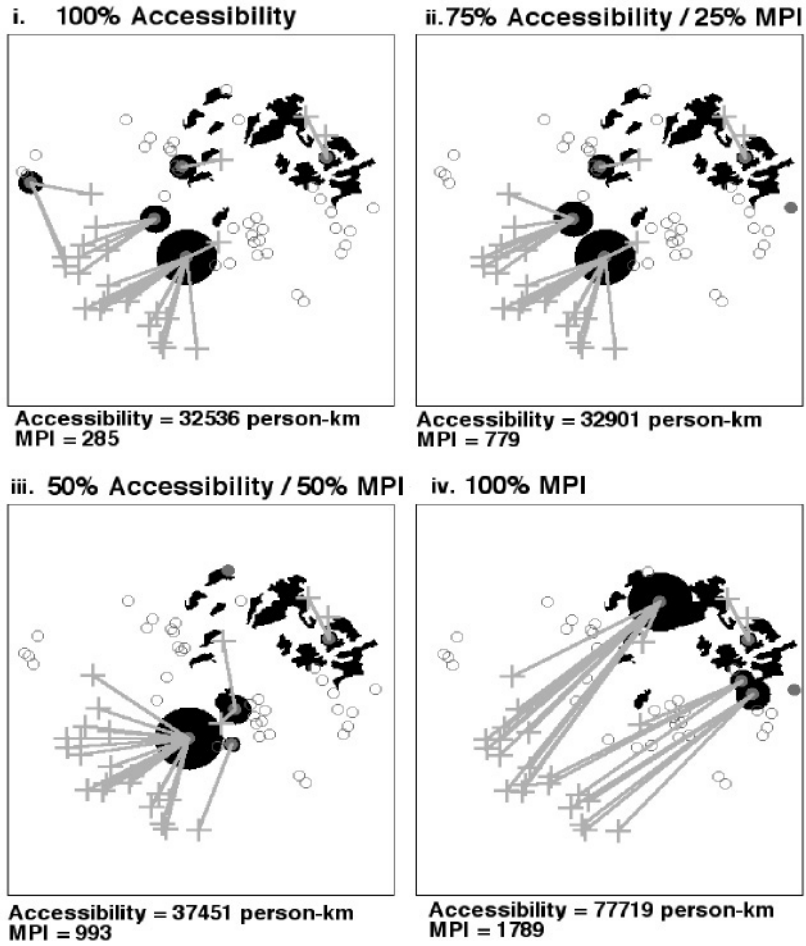


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CHAPTER 14

THE ROLE OF SECONDARY CITIES IN RAPIDLY INDUSTRIALIZING COUNTRIES:THE EXAMPLE OF KAOHSIUNG, TAIWAN

JACK F. WILLIAMS

A major issue facing many countries in Asia (not to mention the rest of the world) is the role of secondary cities and how to strengthen them, especially when rapid industrialization occurs. The generally accepted argument is that a reasonably normal, or balanced, rank-size distribution of cities is healthy for just about any country, because such a distribution normally is indicative of a well balanced distribution of population and modern economy. The opposite, of course, is the phenomenon of urban primacy, which results when one giant city tends to be several times larger than the second city, and to have a disproportionate share of national urban functions and modern economy. This situation is widely criticized because of the regional and socioeconomic inequalities that it reflects, and the unhealthy distribution of people and economic resources (Knox 1994, 1-32). Most of the Asian countries exhibit the latter problem, i.e., varying degrees of urban primacy. In this group, one could list: North and South Korea, Japan, Taiwan, the Philippines, Indonesia, Malaysia,Cambodia, Thailand, Myanmar, Bangladesh, Pakistan, and Sri Lanka. Of the major countries in Asia, only China and India appear to have avoided the most serious aspects of urban primacy, although both Mumbai (Bombay) and Shanghai account for disproportionate shares of national economic output in their respective countries.

Competition and rivalry between the first and second cities are thus also not uncommon in Asian countries, as secondary cities struggle to find their identity and role, maintain growth and a sustainable living environment for residents. Just in East Asia, one can see this situation in the competition between Pusan and Seoul in South Korea, Osaka and Tokyo in Japan, and Kaohsiung and Taipei in Taiwan. The latter case is unique in some respects, because of the peculiar political status of Taiwan and its impact on urban development on the island. Yet, at the same time, Kaohsiung's dilemma has a number of characteristics that are shared by many other secondary cities in Asia. The purpose of this chapter, thus, is to examine the case of Kaohsiung, as illustrative of the problems encountered by secondary cities in rapidly industrializing countries, in the belief that there is something instructive to be learned from Kaohsiung's experience.

Rondinelli, in a groundbreaking study in the 1980s, provided what is perhaps the best overall analysis of secondary cities in developing countries (Rondinelli 1983). Based on empirical analysis of 31 cities in developing countries, he derived a list of 12

major functions that secondary cities can and ought to perform in their respective regions and countries(Table 14-1).Unfortunately, Rondinelli chose Taichung in Taiwan, rather than Kaohsiung, as one of his 31 case studies, for the simple reason that there were no solid English-language studies of Kaohsiung then in print. No secondary city, however, is likely to fulfill all of the 12 functions Rondinelli outlined, especially not to the same degree. Every secondary city is unique in its own way and hence has some functions peculiar to its region, culture, economy, and political system.

KAOHSIUNG'S ROLE WITHIN TAIWAN

At first glance, one might think there is no problem with Kaohsiung or its place in Taiwan. With 1.5 million population in the city itself, and about another million in the surrounding metropolitan region, the heavily industrialized port city is easily the second largest on the island. Kaohsiung is the site of the island's biggest harbor, the world's third largest container shipping port, and the second-largest dry dock after Nagasaki. Kaohsiung also is Taiwan's leading heavy industrial center, including a large and successful export-processing zone, oil and sugar refineries, and massive heavy industries, especially shipbuilding and steel ("Urban Renewal" 1996, 1). Kaohsiung leads the island in steel, cement, and petrochemical production. Two-thirds of Taiwan's import-export volume passes through Kaohsiung's harbor. There are 10 universities and colleges in the metropolitan region, making the city second only to Taipei as an educational center *(Cityguide* 1998). Kaohsiung is the hub of Taiwan's deep-sea fishing industry and its fleet brings in more than half the annual catch for Taiwan (Hwang 1996, 8). Indeed, Kaohsiung's functions would appear to go much beyond the relatively modest terms delineated by Rondinelli. But that is not how Kaohsiung is viewed within Taiwan, where there is much hand wringing and debate, inside and outside of Kaohsiung, about the city's future, its proper role in Taiwan, and how to overcome the frequent comparisons and lingering rivalry with Taipei as the island's number one city. By loose analogy, if Taipei has become a sort of "New York" of Taiwan, Kaohsiung is at best the "Pittsburgh."

ROOTS OF THE PROBLEM:KAOHSIUNG'S HISTORICAL DEVELOPMENT

Taiwan's urban system is relatively young compared to many Asian countries, especially compared to mainland China, having existed for only about a century in any significant sense (Figure 14-1). Nonetheless, Kaohsiung's contemporary problems have their roots in the city's formative history. In a manner of speaking, Kaohsiung has gone through three transformations since its initial founding. The city's fortunes and transformations have coincided with the four main eras of Taiwan's history: the pre-colonial era, the colonial era, the martial law era, and the current reform era.

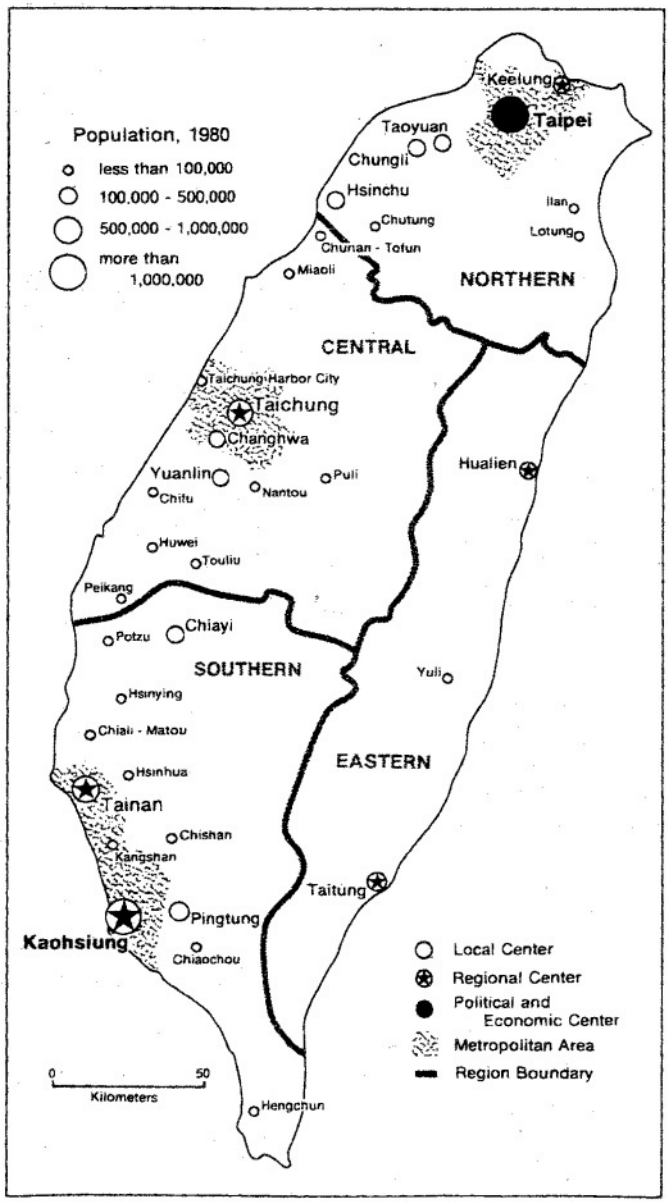


Figure 14-1 Taiwan's Regions and Major Urban Centers. (Source: Williams, 1988).

Pre-Colonial Era (1660s-1895)

Kaohsiung traces its earliest founding to the 1660s when the Ming loyalist, Cheng Ch'eng-kung, and his followers fled to Taiwan after the Manchus took over China and established the Ching (Qing) Dynasty (1644-1911). There was not much to the small Chinese style town, which became known as Takao. After Takao was made a treaty port in 1858 and foreigners were allowed in, a small trading port was added to the existing fishing port in the Tungchih reign (1862-75) (Davidson 1903, 170). Chinese settlement in Taiwan was kept under reins by the Manchus, and urban centers were few and small in population in an overwhelmingly agrarian society. Tainan, just up the coast from Takao, was the oldest and largest urban center on the island then. Davidson reported a population of just 3,700 for Takao at the turn of the century, compared with over 47,000 for Tainan, and just 5,900 for the newly established colonial capital of Taihoku (later to become Taipei) (Davidson 1903, 598).

Japanese Colonial Era (1895-1945)

It was really the Japanese who put Kaohsiung on the map, figuratively and literally. Among their colonial goals in Taiwan were to develop the agricultural potential of the island, and prove to the world that Japan was as capable a colonial power as any of the European countries or America. To those ends, the Japanese realized that they needed a large, modern port in southern Taiwan from which the agricultural products, especially rice, sugar, camphor, and others, could be efficiently exported, the southern coastal plain being the main producing area. Taiwan also had a port, but it was already mostly silted up. Hence, the Japanese decided to dredge and build a modern port at Takao, thus laying the foundations for Kaohsiung's future growth. Takao was renamed Kaohsiung Town in 1920, and turned into a city in 1924, as the Japanese laid out and built a city along somewhat Western urban planning concepts (including a grid pattern for streets), filtered though Japanese minds and tastes of the time, and with *ad hoc* Chinese cultural characteristics mixed in by the indigenous Taiwanese population. As Japan began to prepare for war in the 1930s, modest beginnings of industrialization, such as aluminum manufacturing, were introduced to Kaohsiung, laying the foundations for another of the city's future key functions. The port itself assumed an important role in Japanese military operations during the war, including the invasion of the Philippines in December, 1941. Nonetheless, by the start of the war, Kaohsiung was still a relatively small city of under 200,000 population *(Urban Development White Paper* 1999).

Up north on the island, the Japanese built their colonial capital at Taipei, which the Japanese called Taihoku. It soon became the principal city on the island. A port at Keelung (Chi-lung) on the northern coast also was built by the Japanese, as the closest site to service both Japan and Taipei, which sits in a basin some distance from the sea. Keelung was overshadowed, however, by Kaohsiung as the island's number one international port, a ranking that still exists today. In any event, with Taipei as the center of political administration, culture, and education, and Kaohsiung assigned the principal

role of commercial port and industrial center, the basis for future rivalry between the two cities was established.

The Martial Law Era (1945-1987)

With the return of Taiwan to the Republic of China (ROC) government in 1945, Kaohsiung City was put directly under the Taiwan Provincial Government in 1947. That period of the late 1940s was one of deteriorating conditions in Taiwan, as the ROC was locked in a losing civil war on the mainland. After the 2-28 Incident in 1947, and the formal retreat of the government to Taiwan in 1949, the island was put under martial law, not to be released from its heavy hand for 40 years. The authoritarian government thus was in a position to do whatever it wanted with the island and its resources. Guiding all aspects of development, including urban, was the cornerstone policy of "Recovery of the Mainland", which meant that Taiwan would industrialize and build up a strong economy and military force, for the eventual return to the mainland. Taipei became the "temporary" national capital of the Republic of China, replete with national-level ministries and bureaus, and a fictional "national" government that somehow represented all of the mainland. This artificial role for Taipei gave the city a boost in status, functions, and investment that would never have occurred if Taipei had remained just the capital city of the island. To differentiate Taipei from the province, a separate new provincial capital was built in central Taiwan near the city of Taichung. Had Kaohsiung been able to compete on a level playing field with Taipei in the post-Japanese era, it might well have risen to number one rank on the island, given its superior site, harbor, climate, and other advantages over Taipei.

In a manner of speaking, Kaohsiung became a captive of the unfinished Chinese civil war and a government that had higher priorities than worrying about the living environment in Kaohsiung. As industrialization and economic recovery got underway, the city was designated as the principal industrial center and port for the island (Hwang 1996, 8). The Chinese Petroleum Corporation, set up in 1946 as one of a number of government monopolies, established its first refinery in Kaohsiung. Kaohsiung's port played a dominant role in exports of sugar and other agricultural products, which were the island's principal exports through the 1950s and into the 1960s. By then, import-substitution manufacturing began to be superceded by export-driven growth focused initially on light industries, especially textiles. In the 1960s an export processing zone, where components and raw materials entered duty-free and left as income-producing exports, was set up in Kaohsiung, followed by other zones elsewhere in Taiwan, to attract foreign capital and generate jobs for local workers. These were hugely successful, and served as models of such zones for other developing countries in Asia. As Taiwan moved into heavy industry in the 1970s, the Lin Hai Industrial District was established in the southeastern section of Kaohsiung. China Steel, created in 1971, was one of Taiwan's "Ten Major Construction Projects" during the 1970s, and located in Lin Hai. The huge complex, built in four stages, eventually had nearly 10,000 workers and turned out a wide range of steel products. Nearby, China Shipbuilding (CSBC),

another government monopoly corporation, was established. CSBC eventually constructed 90% of Taiwan's new ships and employed 30,000 people in 90 factories and 30 research institutes on the island. The Kaohsiung shipyard was the world's seventh largest by the end of the 1980s, and its drydock the second largest, capable of handling supertankers up to 500,000 tons. The city had definitely become the leading heavy industrial producer in Taiwan, with a booming economy based on petrochemicals, steel, shipbuilding and ship breaking, and heavy machinery.

Administratively, an important change took place in 1979 when Kaohsiung was upgraded to a special municipality directly ruled by the ROC central government in Taipei. Under the government's "Sell-Governance Law for Provinces and Counties," there were just two "national" level municipalities (requiring a population of at least one million, later raised to *1.5* million in 1994)—Taipei (elevated to this status in 1967) and Kaohsiung. Below these two were five "provincial" municipalities (requiring a population of at least 600,000 and important "province" level functions)—Keetung. Hsinchu, Taichung, Cbiayi. and Tainan. These five were equivalent to counties in status. In the third tier, by the late 1990s there were 23 "county" municipalities (requiring a population of at least 150,000 and important industrial/commercial development) ("City Rankings" 1998).

This seemingly enhanced status for Kaohsiung reflected the success of the city in fulfilling its role as the principal heavy industrial center for Taiwan, and the government's belief that the city's continuing contributions to the island's economy were too important to be left in the hands of either the provincial government or the city government. Moreover, a peculiarity of this status was putting the Kaohsiung port under the direct administration of the province, a compromise with provincial-level politicians. Kaohsiung thus became one of the few major ports in the world where the city government did not have a direct say in running of the port itself, a political bifurcation that made it extremely difficult to develop the city in any coherent or coordinated way between port and city. Anything having to do with the port had to be channeled through the provincial government, and anything with the city (whose mayor was appointed by Taipei) had to go through the central government. It was a monstrously ponderous and inefficient administrative system, perhaps deliberately, so that central government priorities on Kaohsiung's heavy industrial role would not be compromised by messy considerations of living environment for the people actually residing in Kaohsiung. That population consisted of an overwhelmingly blue collar work force and dependents who flocked to the city to fill the many industrial jobs created over several decades, Kaohsiung's growth, and the city's living environment, in this era of about 1950-1985 bore striking similarities to conditions in some of America's major heavy industrial cities in the pre-World War II decades, such as Pittsburgh, Cleveland, and Gary.

Kaohsiung in that era could be described as gritty, grimy, and gray. Air and water pollution were reaching alarming levels. The misnamed "Love" River, a major waterway through the city, was one of the most polluted urban rivers in the world. There were few urban amenities, no real high rise buildings, almost no cultural life, extremely limited green space and recreational facilities. Swimming at the main beach south of the

port entrance was not advisable, and even walking on the beach meant the risk of stepping on tar and other industrial debris. Kaohsiung did not invite repeat visits, nor even first-time visits, by tourists to an island (Taiwan) that had a very poor reputation anyway in international tourism circles.

The Reform Era: 1987 - Present

Kaohsiung was rescued by events that swept the island starting in the late 1980s. The lifting of martial law in 1987 and beginning of indirect but extensive linkages with China in trade, investment, and tourism, brought dramatic changes to all of Taiwan, including Kaohsiung. The stranglehold of the Kuomintang (KMT) Party over Taiwan's political and economic system rapidly unraveled after 1987, leading to the emergence of opposition parties (most notably the Democratic Progressive Party, or DPP), and a general political and human rights flowering that brought Taiwan to the forefront of Asian countries in terms of liberalization to match the island's phenomenal economic success story of past decades. Suddenly, anything seemed possible in Taiwan.

People in Kaohsiung took note and started to push for change. Already in the early and mid-1980s, public protests against environmental degradation began to be mounted in Kaohsiung (and other parts of Taiwan), as the public's boldness was strengthened (Williams 1994). As political opposition to the KMT increased, the government began to accept the reality that the status quo, in the case of Kaohsiung, was no longer acceptable. While for national security considerations Kaohsiung had to remain the bastion of Taiwan's heavy industrial base, there was clearly a need to create a far more liveable city and to begin to diversify the economy and find an expanded role for Kaohsiung in the increasingly global economy, especially with the ongoing threat and opportunity presented by mainland China. In 1990, a new KMT mayor, Wu Den-yih, was appointed for Kaohsiung ("Heart Trouble" 1996). As things turned out, he was the last such mayor for Kaohsiung, as the practice of appointing mayors for special municipalities ended in 1994, along with the reluctance of such political appointees to make waves by trying to develop the city and hence risk one's political future. Wu, however, began a serious process of questioning the central government's policies toward Kaohsiung and its role within Taiwan. He started a number of bold initiatives to turn Kaohsiung around, and as a result won in Kaohsiung's first mayoral election in 1994 ("Boomtown or Bust" 1996). Wu worked hard and issued a bold urban development plan just before the 1998 election, hoping that plan and his record in office would help convince voters to give him a third four-year term as mayor *(Urban Development White Paper* 1998). Unfortunately for Wu (a mainlander), insufficient numbers of voters were convinced, plus the fact that Kaohsiung is overwhelmingly Taiwanese in its ethnicity (as opposed to mainlander Chinese who are much more prevalent in Taipei), and a DPP candidate, Frank Hsieh (a Taiwanese), was elected as mayor. Nonetheless, Wu got Kaohsiung started on a path of reform that continues today.

THE NEW KAOHSIUNG

The changes underway or planned for Kaohsiung are not likely to change Kaohsiung's status as second city of Taiwan, but do hold promise for making the city both far more liveable, as well as having a sounder economic base better able to handle whatever vicissitudes the future might hold.

Increased Support from Central Government

An ongoing bone of contention between people in Kaohsiung and the central government has been the belief that the ROC government has consistently favored Taipei at the expense of Kaohsiung (and the rest of the island).The argument is that government investment and financial support have not been distributed fairly over the decades. For example, Mayor Wu pointed out in 1996 that the budget allocated US$5.8 billion for Taipei city government, but only $1.8 billion for Kaohsiung, or that Taipei received US$4 billion to clean up the Tamsui River, but Kaohsiung did not have enough money to clean up its notoriously polluted drinking water ("Heart Trouble" 1996, 17). By 1998 at least, the ROC government seemed to be listening. As part of the larger plan to streamline the Provincial Government, Premier Vincent Siew in the fall of 1998 pledged that the administrative districts of Taiwan's 21 counties and cities would be realigned to ensure balanced rural and urban development and to preserve the autonomy of local-level governments("Premier Pledges" 1998, 2). As part of this plan, a Southern Taiwan Service Center was established in Kaohsiung in June, 1998, with the goal of coordinating an equitable development strategy for the economic sphere as well as social, educational, scientific and other sectors in the south. This includes over $380 million for harbor expansion, urban renewal, improvement of the water supply system and other public facilities in and around Kaohsiung. Included also is a new science park near Tainan, already under construction, to match the older existing science park in Hsinchu in the north, that is expected to create 30,000 jobs and help lead the high-tech revitalization of the Kaohsiung-Tainan Southern Industrial Region ("Southern Taiwan" 1998, 3).

Yet, the government's position on regional development in Taiwan remains murky, in part because the government must deal with many contending interest groups and can never satisfy everyone. In the government's budget for fiscal year 2000, Taipei and Kaohsiung together were to receive 47% of the central government's subsidy outlay, followed by 35% for counties and county-level cities, 12% for the hundreds of townships in Taiwan, and the remaining 6% for emergency relief funds. Suggestions to then cut the levels of funding for Taipei and Kaohsiung to 41% met with fierce complaints from the mayors of those two cities, forcing the government to reinstate the original plan. Understandably, local-level chiefs were critical of Taipei and Kaohsiung, arguing that Taiwan's two biggest cities have developed at the expense of the other cities and counties on the island ('Taipei, Kaohsiung Subsidy Intact" 1999, 2). Whether the 47% figure will hold true in the future remains unclear, leaving the whole issue unresolved.

Obviously, Kaohsiung's problems have to be viewed within the context of the island's total urban system, but Kaohsiung has been arguing that it has first claim on any increases in government largesse, citing its contention of long-standing unfavorable treatment from Taipei and a much greater need for the money compared to lesser cities and towns in Taiwan.

Everything is relative, of course. Taiwan does not begin to have the severe urban primacy and regional imbalances to be found in the Philippines or Thailand, to pick just two examples. In fact, if one goes back and examines the urban history of Taiwan, the government has actually been struggling to promote more balanced regional development since at least the 1960s, when real urban planning got underway (Williams 1988). Through a variety of measures over the years, including rural industrialization, infrastructure development, and other programs, the island has managed to develop a relatively normal rank-size distribution of cities. Nonetheless, Taipei still retains some elements of urban primacy, in terms of its dominance of government, culture, education, banking and finance, and non-heavy industry. Moreover, the Northern Industrial Region, centered on Taipei, still produces about half the island's GPD, compared to about one quarter derived from the Southern Region (Kaohsiung-Tainan) (*Urban Development White Paper* 1988, 53). From the viewpoint of residents outside the Taipei metro region, and specifically those in Kaohsiung, there is still too great an imbalance and favoring of Taipei.

Under Kaohsiung's 1998 long-range development plan, issued by Mayor Wu, a number of initiatives and projects were laid out that were designed to put Kaohsiung on the right track for the future (*Urban Development White Paper* 1998; "Kaohsiung Multi-Function" 1998). These included: integration of the city and its harbor, comprehensive development of Kaohsiung Harbor, the new South Region International Airport, completion of Kaohsiung's Mass Rapid Transit System, construction of a World Trade and Exhibition Center, ocean reclaimation to create new land for urban/industrial expansion, linking up with the new High Speed Railway being built between Taipei and Kaohsiung, and other projects.

Integration of City and Harbor

A top priority has been the integration of Kaohsiung City and its harbor. In 1997 President Lee Teng-hui openly endorsed integrating the administration of city and harbor. Intense debate ensued, and the measure was finally approved. Kaohsiung Port formally came under the administration of Kaohsiung City in 1999. Money and political power were the central issues, of course. Annual user fees of US$218 million are paid to the harbor, of which one fourth goes to the city government's budget and the rest handed over to the provincial government ("Lee Supports" 1997, 4). Not surprisingly, the provincial government was not keen to lose its jurisdiction over the port and a major source of revenue. However, with the drastic downsizing of the provincial government underway, it was only a matter of time for Kaohsiung City to win its argument for control of the port as well. (One consequence of the gradual downsizing of the provin-

cial government was the decision of James Soong, former Governor of Taiwan and an old protege of President Lee, to break away from the KMT Party, in part because of his opposition to the new policies about the role of the provincial government, and to run as an independent candidate in the March, 2000 Presidential election for Taiwan, He lost the race, but the contest revealed how closely Presidential politics are entwined with regional development on the island.) The Central Government finally came to realize the importance of upgrading the quality and efficiency of the port, especially in light of the government's larger plan to make Taiwan an Asian Pacific Regional Operations Center (APROC).

APROC and Kaohsiung Port

APROC aims to make Taiwan into six regional operations centers in manufacturing, sea transportation, air transportation, finance, telecommunications, and media. Kaohsiung's role is to be the sea transportation hub for Taiwan and a good part of Asia ('Development Plan of Asia-Pacific" 1998; *An Initiative into the Next Century* 1995). Already by the 1980s, Kaohsiung had become the third largest container port in Asia and the world, after Hong Kong and Singapore. By 1993, however, Kaohsiung was slipping in terms of its annual growth compared to its two main competitors. By 1996, Kaohsiung handled 5.06 million twenty-foot equivalent units (TEU5), compared with Hong Kong's 13.28 million and Singapore's 12.95 million ("Lee Supports" 1997). The prospects for Kaohsiung fulfilling its role in APROC were dimming. Hence, the central government's decision. Low efficiency of Kaohsiung's harbor is the central problem, but not the only. Critics have observed that the majority of the docks are directly managed by the harbor authority, and operate at one-half the container-handling efficiency of docks leased to private shipping firms. Moreover, harbor facilities need to be upgraded, but such funding comes slowly because of complicated budgetary processes resulting from the web of overlapping responsibilities between central, provincial, and city governments ("Urban Renewal" 1996). Other issues include the migration of labor-intensive industries out of Taiwan to lower-cost sites (such as mainland China), and the continuing ban on direct cross-strait shipping (only partially lifted in a modest trial run in 1998). Thus, one can see that Kaohsiung's fortunes are still closely tied to the long-term resolution of political issues between Taiwan and the Peoples Republic of China (PRC).

In a survey of international transportation companies in the late 1990s by Frederick Harris Pollsters, the top five changes recommended by those companies to make Taiwan their company's regional operations center were (in descending importance): (1) open direct transport links with the PRC; (2) reorganize seaport authorities; (3) reorganize customs; (4) cut restraints on foreign businesses; (5) expand air and seaport facilities ("Taiwan White Paper" 1996, 53). Only the second recommendation has been really accomplished so far.

With administrative control established over Kaohsiung Port, the City Government hopes that its Multi-Function Commerce and Trade Park Plan will provide the

means to capitalize on the city's existing heavy industrial base, while providing the facilities and living environment for a swift transformation into high-tech and service industries focused around Kaohsiung's enhanced role as the primary international sea transportation center. In short, Kaohsiung is struggling to reinvent itself.

Kaohsiung's Urban Living Environment

That reinventing requires overcoming a huge image problem derived from decades of relative neglect and a public perception of the city as a great generator of industrial products and wealth for Taiwan, but not a good place for anyone to live. How to turn around both image and reality? Reality has already been improved in the last ten years, but image is tougher. To try to reverse this situation, in 1998 the Kaohsiung Metropolitan Development Foundation staged a two-day "Kaohsiung Metropolis Exhibition" in Taipei, its arch rival. The purpose was to "sell Kaohsiung." ("Selling Kaohsiung" 1998). A series of exhibits were designed to try to convince people of Taipei, especially yuppies (Young Urban Professionals), that Kaohsiung offers the greatest opportunities of any city in Taiwan for economic advancement and for a quality living environment The argument put forth by Kaohsiung planners is that Kaohsiung needs to reinvent itself and become more of a white collar city with all of the amenities and facilities associated with service-based cities, such as Taipei. Only then will Kaohsiung be able to attract the entrepreneurs and services that are currently concentrated in the Taipei area. It still is a tough sell. As one writer put it, "Although there are numerous flights that can take you between Kaohsiung and Taipei in fifty minutes, the 'psychological distance' is greater than from Los Angeles to Tokyo." ("Selling Kaohsiung" 1998, 13). In a survey taken of Taipei residents in 1998, two of the most revealing findings were: (1) 67% felt Taipei was the best place (in Taiwan) to achieve ones ideals; and (2) less than 2% thought Kaohsiung the best place to live in Taiwan if they were to leave Taipei. Most had no intention of moving. In reality, thousands of people leave Taipei City each year, moving to suburban communities that have sprawled across the landscape in recent decades, a sort of Taiwanese version of counter urbanization (Williams and Sutherland 1983). The Taipeilanders are actually saying they do not want to live in Taipei City, but do not want to leave the Taipei region. Kaohsiung would like those migrants to keep moving all the way south to Kaohsiung.

By contrast, a similar survey of Kaohsiung residents revealed that: (1) a large majority was dissatisfied with cultural and educational levels; but (2) most were satisfied with living space, space for development, civility, cost of living, and just proud to live in Kaohsiung. Opinions were about evenly split on quality of the natural environment ("Selling Kaohsiung" 1998, 20-23). Obviously and unfortunately for Kaohsiung, reputations tend to linger on long after reality has changed; this is true of cities as well as people. Another notable quote was by Wu Chien-kuo, director of the Kaohsiung City Information Department: "Taipei is like a middle-aged gentleman, cultured and well-mannered; Kaohsiung is like a youth—direct in expressing its feelings, prone to mistakes—but possessing a limitless future" ("Selling Kaohsiung" 1998, 12).

Lingering air and water pollution are hard to disguise, of course, and these are well-known problems in Kaohsiung, problems only partially tackled so far. Take water pollution, for example. The Nanhua Reservoir provides about one third of the city's daily water supply. That water is relatively clean. The remaining two thirds comes from the Kaoping River, which is heavily polluted by agricultural pesticides and livestock waste and by illegal dumping of garbage. The Kaoping's water quality is E, lower than Grade D water which is not even suitable for irrigation. Boiling the water twice may make it safe to drink, but taste is another matter. Most people buy drinking water from trucks that deliver throughout the city. While Taipei water also is not safe to drink directly from the tap, its quality still is much better than Kaohsiung's.

In the case of air pollution, most of Kaohsiung's bad air comes from heavy industrial smokestacks (compared to motor vehicles as the main culprit in Taipei). Sulfur dioxide emissions above 80 ppb are considered unhealthy by the US EPA; average rates well over 100, in some places as high as 125 pph, were recorded in Kaohsiung in the 1980s and early 1990s. In 1990, Kaohsiung had more than 6,000 factories within city limits, an average of 60-80 per square kilometer ("Selling Kaohsiung" 1998, 16). The author recalls well the unpleasant "taste" of Kaohsiung's brownish air in past bad air days. Progress has been made, however, and clear airdays now outnumber bad air days. One of the most notable success stories in cleaning up air pollution is with China Steel Corporation, a pillar of the Kaohsiung economy and former government monopoly that has been reconstituted into a "forward looking, innovative, environmentally conscious, socially aware, technologically efficient, and financially profitable private enterprise" *(PRCUD Kaohsiung Report* 1998, 4). A visit to its sprawling site in the fall of 1998 revealed a remarkably clean and prosperous looking industrial operation that is seen by many in Taiwan as a model of how to turn around formerly polluting industrial plants. If one could ever describe a steel mill and associated facilities as "attractive", CSC would be it.

The lack of green space adds to Kaohsiung's problems. Taipei has an average of 15 trees per person, nothing to boast about compared to most European or American cities, but Kaohsiung has a pitiful two per person ("Selling Kaohsiung" 1998, 15-16). Yet, there is much more greenery evident throughout the city, including along handsome new boulevards, than was true ten years ago. Indeed, the city government likes to boast about the fact that in 1979 there were only 117 hectares of green areas in the city; by 1998 the figure had been increased to 395 hectares spread over 180 green areas ("Remolding the Environmental Landscape" 1998). A big improvement, to be sure, but there still is need for far more green space if Kaohsiung is going to be able to successfully sell itself. A vigorous public environmental movement has developed in Kaohsiung in the last ten years, illustrated by the Weiwu Park Promotion Association (WPPA), typical of countless NGOs that have sprung up all over Taiwan in the reform era ("Greening of Kaohsiung" 1997). The WPPA has promotion of a "green revolution," as it calls it, as its primary goal, but sees overall improvement of the physical environment as a top priority for the future of Kaohsiung.

Urban Architecture and Renewal

A highly controversial area of development for Kaohsiung, and true of virtually every city around the world that struggles to develop in the "right" way, is urban renewal and what kind of architecture should be promoted. After all, cities are for people, and people respond positively or negatively to the style, heights, and locations of buildings.

A common tendency in major cities almost everywhere is to go for high-rise construction. Cities compete for the dubious honor of having the highest skyscraper, as if that building somehow gives a city a special status above all others, and will ensure success, whether in economic development or attracting the right kind of migrants and investors. Many critics contend that taking this approach is to chase illusions. Kaohsiung appears to have fallen into this trap also (Baltierra 1993).

The controversy started with the Grand 50 Tower, which opened in 1993, rising 223 meters above downtown Kaohsiung. It briefly held the title of tallest office building in Taiwan. Taipei stole the title back in the mid-1980s with the Shin Kong Tower, near the Railway Station, rising 51 stories. Kaohsiung struck back with the US$730 million, 85-floor, 368-meter hig skyscraper known as the T&C Trade Building, which opened in 1998, and recaptured the title for Kaohsiung ('World's Tallest Skyscraper" 1997, 4). Not to be outdone, Taipei is currently constructing the Taipei International Financial Center.This skyscraper will surpass the Petronas Tower in Kuala Lumpur. Kaohsiung is countering with its AsiaCenter, whose 103 stories will reach 431 meters ("Reach for the Sky" 1999). The competition between Taipei and Kaohsiung thus goes on, but one also can see this silly competition throughout Asia, in cities such as Kuala Lumpur, Hong Kong, Shanghai, and others trying to outdo one another. High rise construction is an inevitable consequence of rising land costs in central cities and hence justified on that basis. But how high should buildings go? In Kaohsiung's case, critics argue that land is still relatively plentiful and cheap, certainly compared to Taipei, and extremely high rise buildings just do not make sense in this stage of Kaohsiung's development. Being bigger does not necessarily make Kaohsiung better, nor more modern or progressive.

Moreover, architects in Kaohsiung (and the rest of Taiwan) are currently struggling with identity problems and what kind of high rise architecture can best portray the character of the island's culture and not be just slavish imitations of Western, international styles. Taiwan's controversial skyscrapers demonstrate this problem facing many cities of Asia. Whether Kaohsiung's quest for its own identity can be accomplished with super high rises, of whatever architectural design, is being hotly debated. Kaohsiung's skyscrapers stand as crass symbols, critics say, of Kaohsiung's self-promotion and misplaced priorities.

The other side of the coin of new construction is, of course, historical preservation. Kaohsiung is a relatively young city, with almost nothing still surviving from before the Japanese buildup that started in the 1920s, and hence does not have the old structures to be found in Tainan, or even the significant Japanese-era buildings to be seen in Taipei. Nonetheless, a city loses its soul if it demolishes everything that is old,

just because it is old and does not fit the image of the modern city. Most countries of Asia have a dismal record in historical preservation; Taiwan is no different, Historical preservation is just beginning to be addressed in Kaohsiung. If Kaohsiung really wants to sell itself as a city worthy of its residents, it needs to take a much more active position in preserving what is worth saving from the past, even if those structures are associated with a former colonial ruler. Taipei provides a valuable example, where key structures from the colonial era are maintained as important public buildings, reminding people of a vital period in Taiwan's history.

On the positive side, Kaohsiung has taken important steps to beef up its cultural and educational standards, which historically have been much below those of Taipei. The recently constructed Kaohsiung Museum of Fine Arts is an excellent museum with great potential. The metro region already has a sizeable higher education structure, joined recently by the National Institute of Technology and Kaohsiung Hospitality College. National Kaohsiung University is slated to start soon as well. The National Museum of Marine Biology and Aquarium were slated to open in 2000. Culture and education are a dimension of Kaohsiung that will take a long time to develop, however, hand in hand with population growth and expansion of the better educated, white collar work force. Taipei was not a sophisticated, cosmopolitan city, by any stretch of the imagination, 50 years ago. It has taken that long to transform Taipei. Kaohsiung's transformation may well take as long.

Transportation

Internally, Kaohsiung does not have the near gridlock of surface transportation that has plagued Taipei in the last 20 years. Kaohsiung's traffic, while not inconsiderable, has its difficulties, due to rapid increases in private motor vehicles in recent years. A great deal of road construction has helped. The government also has been trying to develop a Mass Rapid Transit system, but unfortunately the project has been stymied by many of the same bureaucratic and public works disputes that caused so many delays and cost overruns for Taipei's MRT, which is just beginning to make a dent in Taipei's traffic problems ("Off the Rails" 1996, 73).Kaohsiung's MRT has been stalled, but undoubtedly will eventually get completed. Some critics complain, however, that the MRT likely will not solve Kaohsiung' s traffic problems and may not even be needed; much needed improvements in the surface bus system might do the trick at a fraction of the cost of the MRT, but of course without the glamour of a MRT (Su and Wu, 1998).

A larger issue is the High Speed Railway (HSR) that is currently being built to link Taipei and Kaohsiung. At a projected cost of over US$12 billion, the HSR will be the largest build-operate-transfer project in the world. Scheduled for completion in 2003, the HSR will complete the 340-kilometer journey between Taipei and Kaohsiung in just 90 minutes, compared with the 4.5 hours needed on Taiwan's present train system ("High Speed Train" 1998, 3). Will the HSR be a blessing or a curse for Kaohsiung's future? Opinions are divided. Some contend the HSR will enhance the flow of goods and increase the utility of Kaohsiung's Port (assuming the Port's efficiency is suitably improved by then). Others argue that the HSR poses the risk of making it even easier for

white collar workers to commute long distances to jobs in the Taipei region, while enjoying relatively low cost housing and less crowded environments in Kaohsiung. One could indeed envision a linear megalopolis (similar to the Tokaido Megalopolis linking Tokyo-Nagoya-Osaka in Japan) stretching someday from Taipei to Kaohsiung, with key nodes at Taoyuan, Hsinchu, Miaoli, Taichung, Changhua, Yunlin, Chiayi, Tainan, and Kaohsiung, the nine secondary and tertiary cities at which the HSR will stop along the route. However, the power center could be firmly rooted in Taipei (=Tokyo), with the other cities becoming more like huge bedroom suburbs providing affordable living environments for workers who commute back and forth to Taipei, as opposed to fully independent and economically strong urban centers. This scenario obviously contains some exaggeration, but Kaohsiung would be foolhardy to be complacent. The HSR is coming; it is Kaohsiung' s task to make sure it is ready to take maximum advantage of the HSR.

CONCLUSION

In the end, perhaps the best advice one could give Kaohsiung is to stop comparing itself to Taipei and stop trying to become a second Taipei. The two cities are utterly different, in history, character, and functions. One cannot undo history. Taipei almost certainly will remain the premier city of Taiwan. Kaohsiung has to live with that reality. Kaohsiung first needs to capitalize on the assets it does have: superb harbor; favorable climate; proximity to Hong Kong and mainland China, as well as Southeast Asia; space and reasonably priced land; a citizenry that is remarkably supportive of the city, given the past problems with living environment; a strong industrial base and workforce. Kaohsiung secondly needs to press forward as vigorously as possible with programs and plans to overcome its limitations, especially environmental pollution and the city's blue-collar, unsophisticated image. The city's limitations are really unfairly stereotyped today, but with persistence they can be overcome. The new mayoral administration, ethnic Taiwanese and DPP for the first time ever, has a momentous opportunity and challenge ahead of it. Fail now and Kaohsiung may not have another chance for success in its third transformation.

What are the lessons for other secondary cities? Is Kaohsiung's experience truly unique and offering nothing to be learned by other cities? Certainly the city's political history, within the context of Taiwan's modern development, is unique. But beyond that, there are some themes relevant to other countries, other cultures:

(1) Secondary cities may never rise beyond secondary status, especially where urban primacy exists. History shows us that once urban primacy is established, that primacy is nearly impossible to change, whether by natural forces or by government policies.

(2) Secondary cities should not try to copy primary cities, as the factors that produced primacy for one city cannot be duplicated.

(3) Secondary cities should focus on their own uniqueness and develop their own distinctive identity, based on real assets and advantages they possess. Cities need

to be visionary, but at the same time realistic in their plans and expectations.

(4) Secondary cities cannot neglect the quality of the living environment. Cities are for people, and cities cannot survive and grow successfully without the popular support of the people who live there. Those people need to see real progress in the quality of their lives and the urban environment in which they function. That environment includes not only control of pollution, but also the building of an aesthetically pleasing urban design and architecture, with a humanistic scale and attention to education, recreation, and the arts.

The intangible mix of these diverse elements is what gives a city its "soul," its essence.

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CHAPTER 15

ASSESSING RAIL NETWORK HISTORY IN JAPAN'S KANTO REGION

LOREN SIEBERT

In the second half of the 1800s, after two and one-half centuries of self-imposed isolation Japan was reopened to the world by the Tokugawa military government. Following the Meiji Restoration of 1868, the new imperial government began a series of reforms and new initiatives to modernize the country along Western lines. Among these was the early introduction of railroads, a fairly young technology even in the West.

The first railroad in Japan opened in 1872, just four years after the Meiji Restoration. It connected Tokyo with the new port of Yokohama to the south along Tokyo Bay. In the next decades, many new public and private interregional and intracity lines were opened, and the process of new line construction continues to this day.

The Tokyo area and surrounding Kanto region now have one of the world's most dense and efficient railroad networks. The area served comprises Tokyo metropolitan prefecture, the three adjacent prefectures of Kanagawa, Saitama, and Chiba, as well as parts of Gunma, Tochigi, Ibaraki, Yamanashi, and Shizuoka prefectures. This region has over 100 historical rail lines and over 2000 historical rail stations.

This chapter introduces an ongoing project to record, map, and analyze the history of the Kanto region's rail network using a geographic information system (GIS).

BACKGROUND

A variety of studies in English have looked at different aspects of rail network growth in Tokyo and other areas of Japan. Arisue and Aoki (1970) analyzed stages of expansion based on transportation technology (steam railway, transitional, suburban rapid transit, and underground transit). On a nationwide scale, Taniuchi (1984) described the regional development of the Japanese railway network and its relationship to the development of cities. Ohta (1989, 1991) analyzed nationwide and intracity patterns of development associated with highway and railroad transportation. Brothers (1976) analyzed the role of the subway system in the evolution of mass transit in Tokyo.

Investigations of Japanese railways from non-geographic perspectives include an analysis of railroad politics in the late 1800s and early 1900s (Ramseyer 1995), an analysis of railroads and the state in Meiji Japan,and a detailed comparison of the economics of Japanese private versus public urban railroads in the late 1900s (Mizutani 1994).

Most of the above studies rely primarily on text and occasional data tables, but only rarely on maps, to tell the story of Japanese rail history. Map-based portrayals of

Japan's rail network growth are sometimes found as components of historical atlases or similar studies, where they play minor roles in telling the history of a region. Among the historical atlases that contain some sequential maps of rail network development are an atlas of Edo/Tokyo by Masai (1986) and one on Yokohama by the Yokohama Planning and Coordination Bureau (1981).

Various catalog-type sources in Japanese list the opening dates of rail companies, lines, and stations during the past 130 years. Among these are a chronology prepared in 1972 on the 100th anniversary of Japanese railroads (Tetsudo Hyakunen Ryakushi Hensan Iinkai 1972), a listing of Japanese Railway (successor to the Japanese National Railway) station opening dates (JRR et al. 1991), and two listings of public and private station opening dates (JTB 1985; Chuo Shoin 1995). In addition, there are numerous guidebooks prepared by individual rail companies or in the popular Hoikusha series on rail companies and trains.

Although some of these studies and sources use maps, none of them has taken a systematic map-based approach to analyzing the history of Japanese railroads and its relationship to urbanization and suburbanization. My goal has therefore been to develop a comprehensive, map-based record, visualization, and analysis of rail network growth in Japan's Kanto region. This project is part of a much larger "GIS spatial history of Tokyo" (Siebert 1997) in which I used a geographic information system to map and analyze aspects of Tokyo's historical geography, including changes in shorelines and river channels, changes in administrative units (village, town, city, ward), population changes, rail network development, and other temporal-spatial factors. Separate papers based on that study have been published dealing with the relationship between province vs. prefecture names and the naming of rail companies, lines, and stations (Siebert 2000a) and with the sequential conversion of political units from village to town to city to ward status (Siebert 2000b). Other articles exploring specific aspects of rail network history and other spatial patterns are in review or in preparation.

This chapter introduces some of the types of mapping and analysis that can be done once a GIS spatial database on rail network history has been created. It concentrates on maps and what they can show rather than on details of the GIS data input and database design, covered elsewhere (Siebert 1997; Siebert 2000c).

MAPPING SOURCES AND COMPONENTS

To record the history of the Kanto region's vast rail network, I obtained detailed source materials (such as the catalogs listed above, as well as a series of historical topographic maps from each decade of the 1900s), designed the necessary geographic and database structures in the GIS, and recorded numerous aspects of the system's development. My aim was to be comprehensive in space, theme, and time in order to identify as many different types of historical conditions as possible and to ensure that the GIS would be able to handle all of them.

Many different elements of rail history are recorded in the GIS database, and therefore are available for mapping and analysis. The basic components are:

(1) Rail company conditions, dates, and changes — corporate name, establishment, first operation,ownership type (national, prefectural, municipal, private, joint) mergers/acquisitions, and closures.

(2) Rail line conditions, dates, and changes- route, name, ownership, authorization, construction, opening, suspension (asin wartime or after earthquakes), closure, multiple tracking, electrification, electric-commuter service ("densha"), grade separation (surface, elevated, underground), gauge, power mode (horse-car, human-car, steam, internal combustion, electric), and service type (pas senger vs. freight, interline through service).

(3) Rail station conditions, dates, and changes- name, ownership, opening, suspension (as in wartime or after earthquakes), closure, grade separation, service type (passenger vs. freight), service level (local, semi-express, express, limited express, super-express), and service frequency (number of trains per day).

Many of these data types have been recorded for all known companies, lines, and stations in the Kanto region. Some of them, such as service level and service type, changed frequently throughout the history of the line or station. For these, I am recording information from a sample of current and old train schedules.

With one of the world's most dense rail networks, Tokyo is both an ideal location for producing a GIS rail history, and a very difficult one due to the complexity of the system and the vast amounts of information available. By choosing this extensive system, I have been able to discover a variety of historical situations requiring development of special recording methods in the GIS.

Besides its rail network, Tokyo also had an extensive streetcar system. Yokohama and other cities in the Kanto region also had streetcars. Streetcar route systems are quite different from most ordinary rail networks (e.g., streetcars often take different interconnecting routes along the streetcar track network), so their input is treated as a completely separate project. Adding such information would be essential, however, for portraying the full picture of transportation possibilities in Tokyo, because streetcars served as initial links between the peripheral commuter-line stations before commuter lines and subways extended into the urban core.

GENERAL TYPES OF MAPPING AND ANALYSIS POSSIBLE

It is not possible here to include a full range of maps showing the thematic, temporal, and geographic distribution of the many components of rail network history recorded in the GIS database. Thus, this presentation provides just a very small window

into a very extensive project. A wide variety of rail network events and conditions can be mapped. The following list gives just a few of the possibilities.

(1) Openings of companies, lines, and stations can be mapped by decade, half-decade, year, or even the day.This is the most basic information of the data base.

(2) By using the coded ownership type data, it is possible to map and analyze the temporal and spatial opening patterns for national, prefectural, municipal, private, and joint operations.

(3) By looking at the records of mergers and acquisitions, it is possible to map and analyze changing trends and consolidations, as well as the total number of companies in operation at a given time.

(4) Name changes of companies, lines, and stations can be mapped to reveal one aspect of how rail company owners perceived the geographic significance, scope, and origins of their operations. Name changes of stations can also be used to interpret the images of place that the operators wanted to create.

(5) A variety of changing conditions - such as multiple tracking, electrification, and grade separation - can be mapped to reveal efforts to improve service by increasing such factors as train frequency, reliability, speed, and safety.

(6) In-fill stations - stations that were created along a segment of a rail line after that segment opened - can be mapped to show different stages of urban growth along different rail lines.

(7) Interline through service - continuous service by one company's trains onto another company's tracks - can be used to show accessibility and reductions in total trip time by elimination of transfers. A related concept is "one seat" service - the ability to get to one's destination without changing trains even though multiple lines are traveled along.

(8) Level of service analyses can be done by adding information from historical train schedules to plot the frequency and types of trains serving given stations.

Because this is part of a multifaceted GIS spatial history project, the rail network's history can also be compared with other factors. For example, shoreline changes and river rechannelization had effects on rail locations. Creation of new landfill islands in Tokyo Bay opened up new areas needing rail service or provided more direct routes to connect existing areas. Rerouting of river channels in the delta lands at the head of Tokyo Bay required rerouting of portions of certain rail lines and relocation of stations.

RAIL STATION GROWTH

The remainder of this paper presents one aspect of the assessment of rail network history in Japan's Kanto region — the growth of rail stations.

Number of Rail Stations

Rail lines are inherently linear features: they have tracks, and trains run along those tracks. It is thus typical to portray the development of a rail network by mapping the growth of rail lines. This can easily be done with a GIS spatial database.

However, when we consider the purpose of a rail line - providing passenger and/or freight service - it is clear that the true nature of a rail line is a series of connected points. The station is, in principle, the only place where people and goods enter or leave the train. Thus, to map the growth of a rail system and its relationship to urban form, it can be argued that it is as important to show the stations as it is to show the lines. Between points A and B, the track is really a nuisance, generating train noise and serving as a barrier between the districts on either side of the track. It is only at stations where things can come together - where the rail network becomes useful.

Figure 15-1 shows the total number of rail stations in the Kanto region over the 130 years since rail service began in Japan. Figure 15-1(Top) shows the number of stations open at the end of each decade. For example, at the end of the 1870s (defined as the last day of 1879) there were seven stations (the original stations on the first line between Tokyo and Yokohama), at the end of the 1930s there were almost 1500 stations, and at the end of the 1990s there were almost 2000 stations. (The earlier comment that the Kanto region had over 2000 stations includes those that closed.) A steady growth occurred in the total number of open stations in the late 1800s, rapid growth in the first third of the 1900s, leveling off in the middle decades, then steady growth in the final decades.

Figure 15-1 (Middle) shows openings and closings of stations by decade. The largest growth occurred in the 1920s, with well over 500 new stations. The 1910s and 1930s were next, with almost 300 stations in each decade. Aside from the first decades, the lowest growth occurred in the 1940s and 1950s. Those decades were also the two with the largest number of station closures, with over 50 in the 1940s and over 100 in the 1950s.

Figure 15-1(Bottom) shows cumulative change in rail stations. By combining the "Prior" and "New" segments of each bar, we can see the total number of open stations at the end of each decade. This is the same value as plotted in Figure 15-1a. The white area at the top of each bar shows the number of stations that closed during that decade. The most striking decade is again the 1920s - new stations account for almost half of the bar.

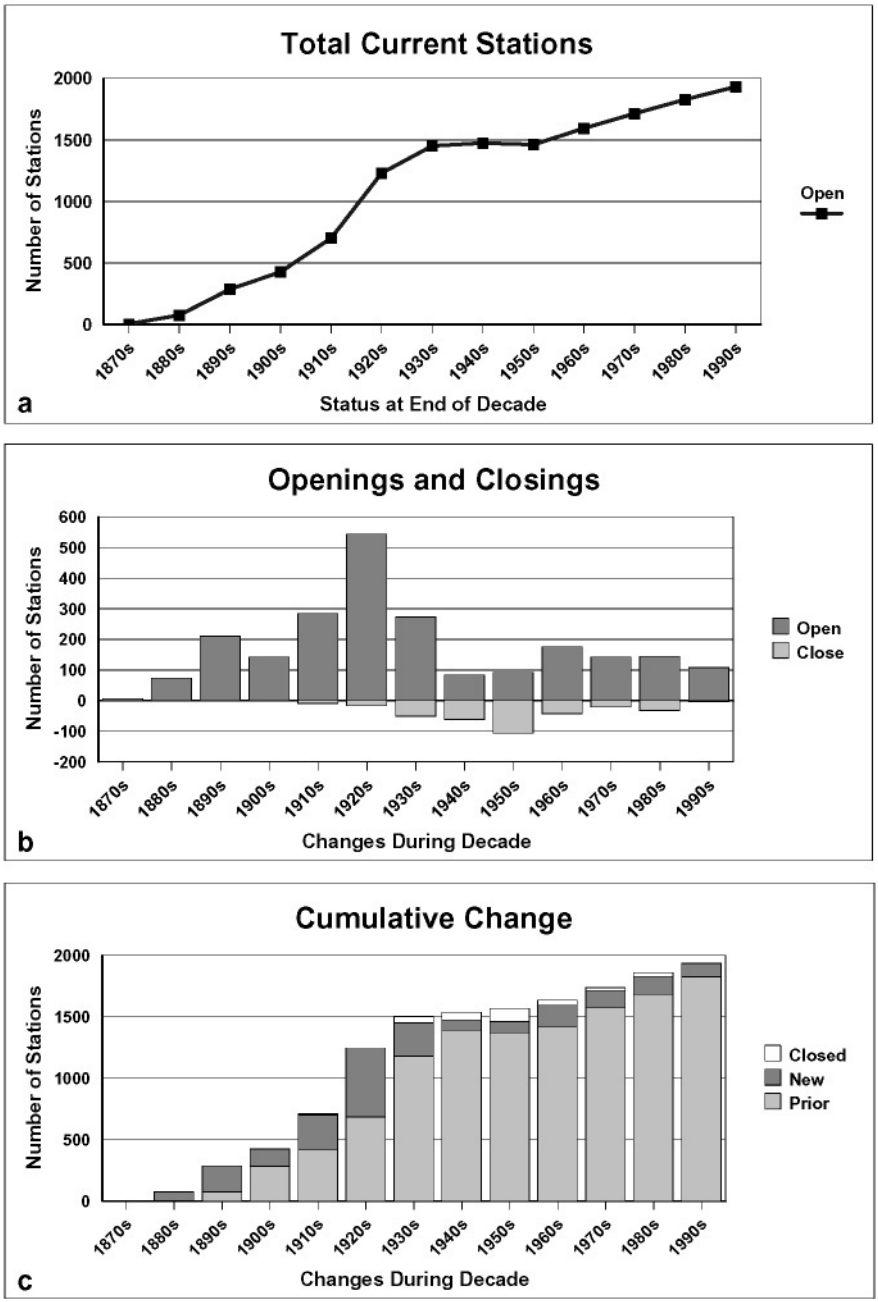


Figure 15-1 Changes in Rail Stations in Japan's Kanto Region, 1870 – 2000.

Access to Stations — One-Kilometer "Station Zones"

Access of passengers to rail lines is an important factor in determining the usefulness of the network for specific individuals. One measure of the geographic distribution of this access is given by one-kilometer-radius zones around each open passenger station. The GIS "buffer" or "band" procedure was used to merge adjacent buffers into continuous zones if adjacent stations were less than two kilometers apart on the same line, or if they were less than two kilometers from stations on nearby lines. The procedure has been done for each of the thirteen decades since rail service began.

Figure 15-2 shows these one-kilometer "station zones" as of 1900, 1910, 1920, and 1930. These depict the condition in the indicated year. Thus, for example, the 1930 map shows what had happened in the 1920s. Although the GIS analysis has been done for the entire Kanto area, the maps used here show only Tokyo Prefecture and its immediate surroundings.

By 1900, there were stations along lines heading in all major directions from downtown Tokyo (at the eastern end of the outlined Tokyo prefecture). However, there were only a few areas with continuous linear station zones - areas where the one-kilometer zones were so close that they merged together. These continuous zones are primarily along the Kobu/Chuo line in downtown Tokyo. (Note: names are given for those familiar with Tokyo's rail lines; space does not permit labeling them on the maps included here.)

By 1910, closely spaced stations along the entire Yamanote loop line in Tokyo formed a continuous linear station zone. This was also true for the entire section of the Chuo line cutting across the loop, as well as for the Tokaido and Keihin lines stretching southward from Tokyo via Kawasaki to Yokohama. This reflects the growth of more stations on existing lines as well as the new private Keihin line, most of which opened in the first decade of the 1900s.

By 1920, there were continuous linear station zones extending westward and eastward as well. These were created by the closely spaced stations on the Keio line and the Keisei lines, built to connect Tokyo to Hachioji in the west and Chiba and Narita in the east, though neither had reached all the way to its intended destination by 1920. Other, shorter segments of continuous station zones can be seen elsewhere in the map, especially where in-fill stations were created on existing lines.

By 1930, there were multiple continuous linear station zones extending out from Tokyo, with some directions, especially westward, but also southward, having many. There also were outlying continuous zones, such as along the Nanbu line from Kawasaki to Tachikawa. This great expansion of continuous linear zones shows the results in Tokyo of the spurt of rail station growth in the 1920s, as depicted earlier.

Relationship of One-Kilometer Station Zones and Political Units

The previous two sections have looked numerically and spatially at the growth of stations, indicating how a larger and larger area became accessible to rail stations. But how does this correspond to the growth of the city of Tokyo itself? One way to evaluate the relationship between rail network growth and urbanization is to map and compare

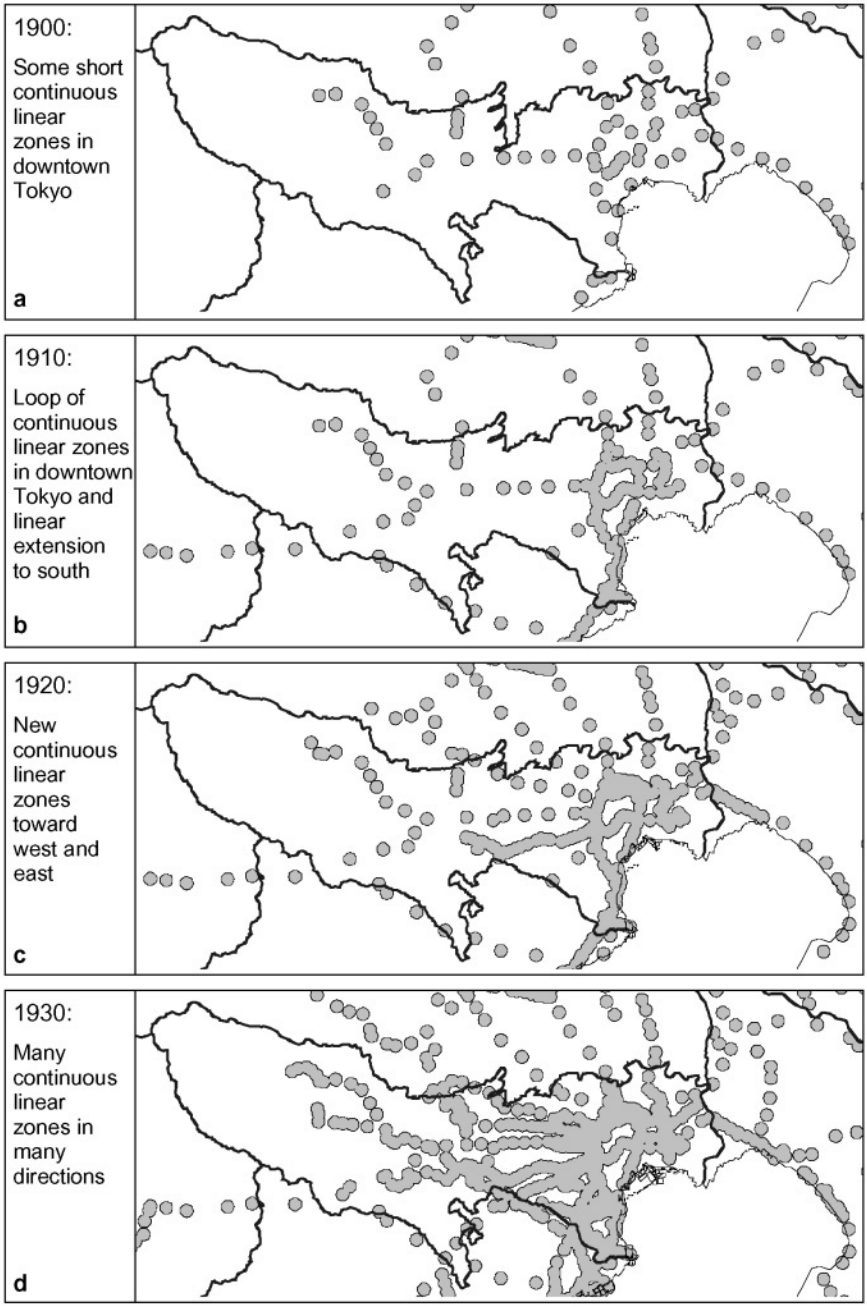


Figure 15-2 Areas Within One Kilometer of Rail Stations in Tokyo, 1900 - 1930.

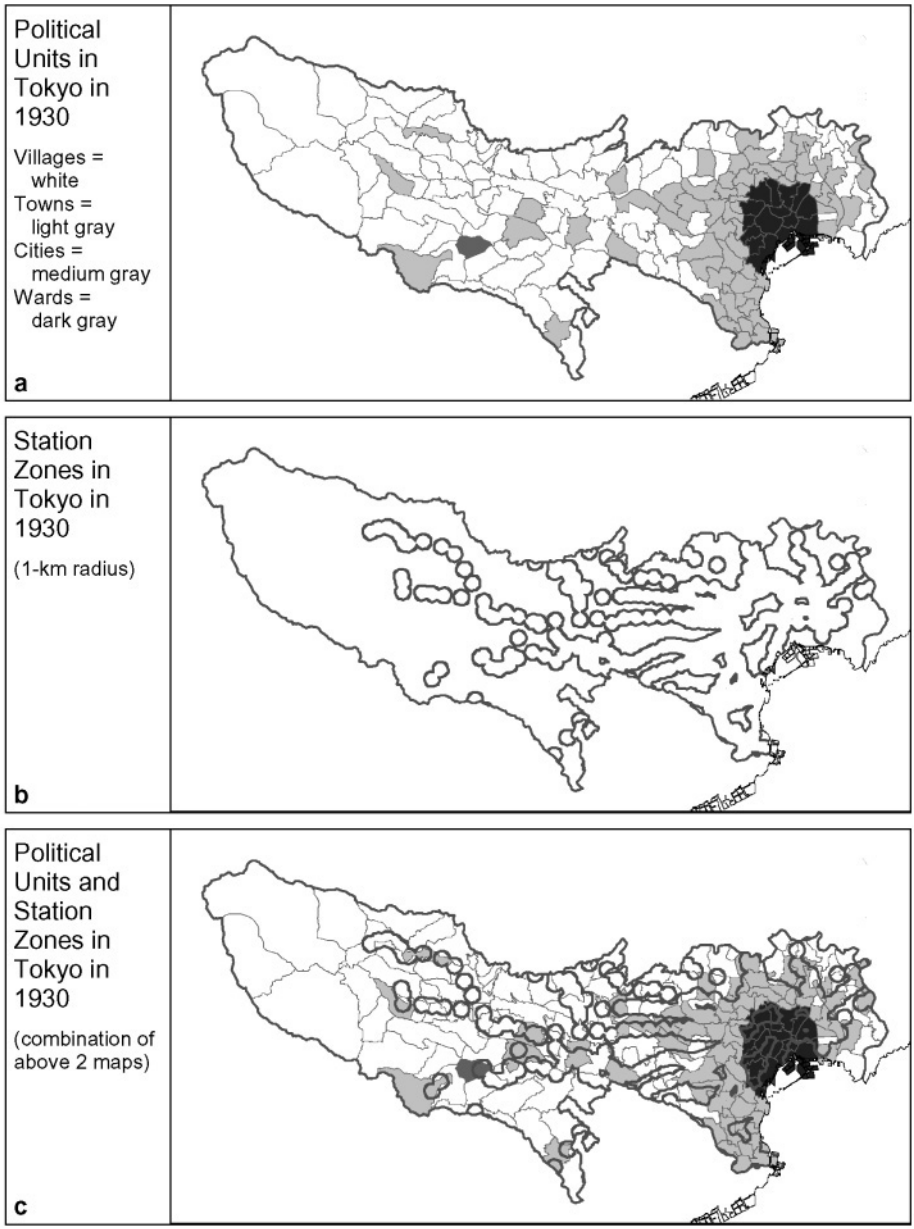


Figure 15-3 Comparison of Political Units and Station Zones in Tokyo, 1930.

the distribution of these station zones (representing access to the rail network) and the distribution of villages, towns, cities, and city wards (representing different population and administrative levels).

Figure 15-3, combining station zone information with administrative history information, shows the results for one decade for Tokyo prefecture. Figure 15-3a shows the political units and their corresponding administrative "level" in 1930. White areas are villages, light gray areas are towns, medium gray areas are cities (only one, Hachioji in the west), and dark gray (or black) areas are the fifteen wards of Tokyo city itself. The primary pattern observable here is the ring of towns around Tokyo. These, along with some adjacent villages, would be added as new ward areas in 1932 and 1936. There also are quite a few towns in the middle part of the prefecture, as well as some in the west.

Figure 15-3b shows the station zones in 1930 in Tokyo prefecture. These are the same as in Figure 15-2d. Here they are shown as white zones rather than gray, to facilitate overlay with the political units.

Figure 15-3c superimposes the station zones on political units in 1930 so the two phenomena can be visually compared. As part of the ongoing GIS analysis, they will later be quantitatively compared. Close inspection of this combined map reveals that in almost all cases, areas that have obtained town or higher administrative status are served by a rail station somewhere within the boundary of the political unit. On the other hand, there are already many station zones, including some continuous linear zones, that serve areas that have not yet obtained town or higher status.

Considering that this set of maps shows conditions in 1930 - representing what happened in the 1920s — this is not surprising at all. The 1920s saw a rapid opening of new lines and new stations, which almost doubled in number, but urbanization had not yet caught up. Using this technique, similar comparisons are now being done for other decades.

Another thing to consider is the relationship of rail stations and the ward area of Tokyo. Careful inspection of the combined map reveals that the ward area had several subareas without one-kilometer access to rail stations. From this, it would appear that Tokyo itself was not as well served as its surroundings in 1930. However, that conclusion only makes sense if we consider railroads, but leave out streetcars (not yet mapped in this project). Most likely, Tokyo's streetcar network would fill in most of the access-less areas. Also, the first subway line in Tokyo was begun in the 1920s (so it partially shows up here), and later subway lines (1950s-1990s) would provide numerous access points within downtown Tokyo itself.

ASSESSMENT AND CONCLUSIONS

This chapter has presented some basic concepts and examples of how a geographic information system (GIS) can be used to record, map, and analyze the history

of a rail network. The examples given showed the numeric and geographic patterns of station openings in the Kanto region and in Tokyo prefecture itself.

The chart of total number of stations showed that steady growth occurred in the late 1800s, rapid growth in the early decades of the 1900s, slow or no growth in the middle decades, and steady growth again in the last decades of the 1900s. These time eras correspond to some extent with the steam railway, transitional, suburban rapid transit, and underground transit eras explained by Arisue and Aoki (1970), but in reality those eras overlapped more than suggested. The rapid growth of commuter stations in the early decades also corresponds well with the view of Ramseyer (1995) that urban rail construction projects were favored more by the government during that period, due to greater political control by democratic, urban-based parties.

The decline in stations in the middle two decades (1940s and 1950s) reflects closures of some lines and stations during World War II. In the 1950s, closures of stations offset new openings. Several light rail lines with closely spaced stations were closed in that decade. The 1960s and subsequent decades saw significant increases in stations as new surface and subway commuter lines were built.

The mapping of one-kilometer-radius station zones showed how the number of continuous linear station zones — with stations no more than two kilometers apart — increased rapidly in the first decades of the 1900s, as many new stations were added on lines extending in many directions from Tokyo. This pattern clearly corresponds with the era of early Tokyo suburbanization described by Watanabe (1984).

Finally, the comparison of one-kilometer station zones and administrative level of political units in 1930 showed the general geographic relationships between new lines and stations and areas with town or higher administrative status.

These are just brief examples of how detailed recording of rail network history in a geographic information system can be used to map and interpret rail network history and its relationship to urbanization itself. Extension of analyses such as these are now in progress, as are other types of analysis, such as comparison of station opening dates, in-fill station dates, and current level of service, to determine whether there is a relationship between early opening of a station on a line and its current prominence as an express stop or transfer station.

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CHAPTER 16
URBAN DEVELOPMENT OF SOUTH ASIA

ASHOK K. DUTT AND ALLEN G. NOBLE

Although South Asia remains largely rural, its urban population is growing much more rapidly than total population (Figure 16-1). Also, cities are acknowledged as the manufacturing, educational, foreign trade, and governmental centers. Even agriculture increasingly looks cityward. It is in the cities that decisions are made affecting all South Asians. The future of South Asia lies in its cities.

South Asia is the least urbanized of all Asian realms. Though in 1950 this realm was more urbanized than its eastern neighbor, Southeast Asia, the latter caught up with and passed it by 1969. In 2000, 390 million people lived in the urban areas of South

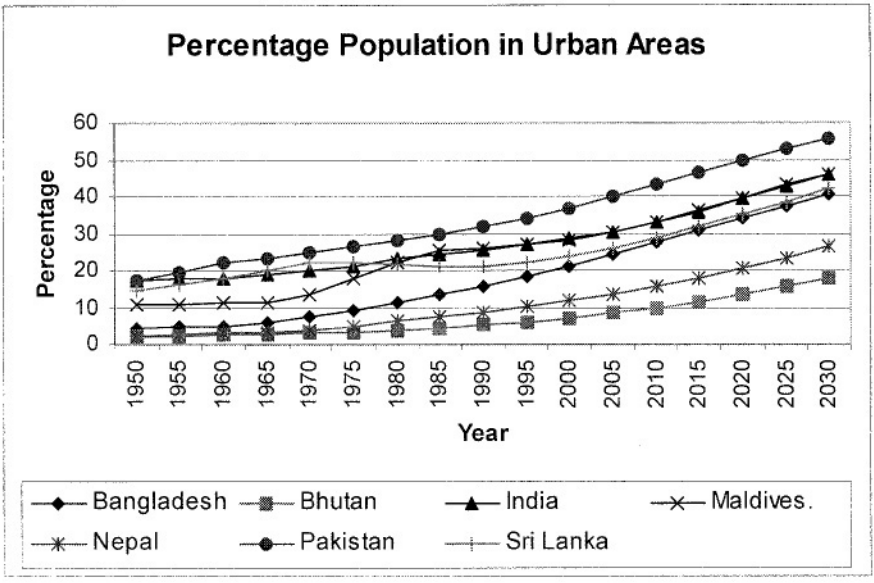


Figure 16-1 South Asia: Percent Urban Population to Total Population 1950-2030.

Asia, whereas in 1950 it was only 72 million (United Nations 1998), a 379 percent rise. Moreover, about one third of the South Asian population lived in urban areas in 2000, compared to 16% in 1950. The United Nations estimates that the average annual rate of change of urban population in South Asia was 3.66% between 1950 and 1955, increasing to 4.27% in 1995-2000. Thus, in spite of South Asia's comparative lag in urbanization, the increasing magnitude and growth of total urban population is remarkable.

Such growth is not occurring at the cost of agriculture, because the increasing numbers of people in the rural areas, from 384 million in 1950 to 958 in 2000, are not being fully absorbed in the village economy, leading to large-scale rural unemployment and under-employment. A growing "rural-push" exists in which large numbers of working-age people are being squeezed out of the villages to seek some kind of employment in urban areas. Rural out-migration is the principal cause of urban population growth in South Asia, though part of the expansion does result from natural increase. Such phenomenal growth heavily impacts the infrastructure, economy and the society of each South Asian country. Along with the growth of urbanization, the 20th century has witnessed an immense and unique revision in affairs of mankind. Patterns of life that have taken over 5000 years to shape in South Asia are changing. Traditional societies are being phased out, and a new urban culture is on the rise alongside modern technology and mass communication.

DIFFERENTIAL URBAN GROWTH BY COUNTRIES

A wide range of urbanization levels and rate of change of urban population exist among South Asian countries(Figure 16-2). In 1996, Pakistan was the most urbanized, with 35% of its population living in urban areas, followed by Maldives and India with 27% each. Bhutan (6%) and Nepal (11%) were the least urbanized, while Bangladesh (19%) and Sri Lanka '(22%) fell in the intermediate category. Except for Maldives and Pakistan, the relative position in urbanization levels has not changed and will not in the foreseeable future. Pakistan, the most urbanized country in 1950, is projected to be surpassed by Maldives in 2005-2010. Both Bhutan and Nepal were the least urbanized in 1950 and will remain so in the year 2025, according to best estimates (Dutt and Noble 1996).

Comparative Growth Rates: India and Pakistan

A comparison of urban growth rates of two of the three most populous countries of South Asia — India and Pakistan — reveals that, though both countries had similar urbanization levels after the Second World War, Pakistan's rate of urban growth has been greater than that of India and will continue to remain so through the decade of the 2020s(Figure 16-2). Pakistan's open economy and a relatively large foreign exchange income derived from temporary migrants to oil-rich Persian Gulf countries encouraged urban development. India opened its economy starting only in the mid-1980s, and further accelerated it in the early 1990s producing a late accelerated pace of urbanization. The trend should continue in the future.

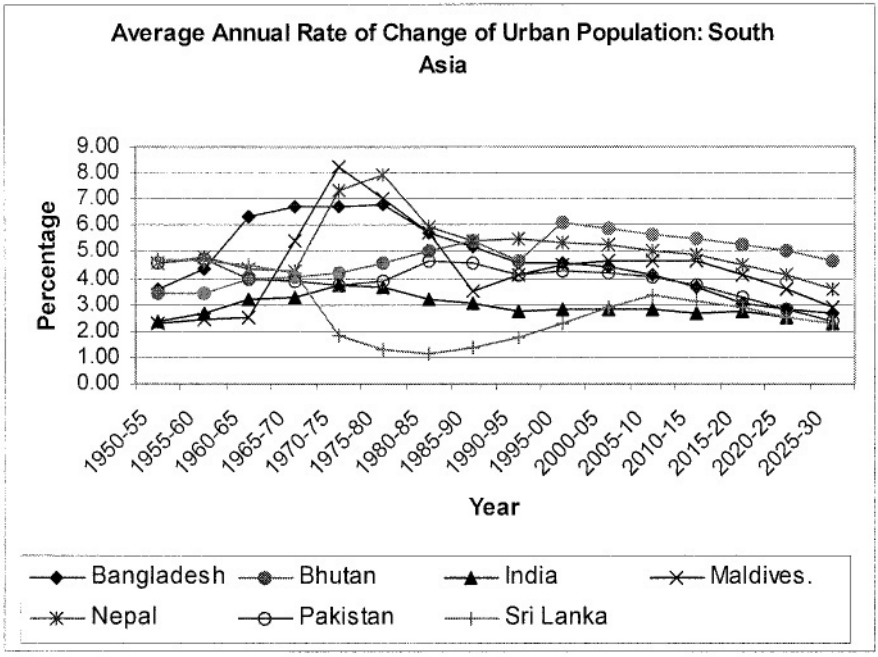


Figure 16-2 Percentile Changes in Urban Population to Total Population by Countries of South Asia, 1950-2030 (Data Source: United Nations).

Pakistan's rapid urbanization also was possible because of the country's rural development programs (i.e. flexibility of irrigation systems and power development), which led to partial mechanization of agriculture, causing migration of landless laborers to the cities. Land reforms also induced rural-urban migration in the Indus plain and delta, where migrant small landowners, tenants farmers, skilled artisans, and landless laborers formed a sizable part of the urban growth. The Green Revolution beginning in 1966 and mechanization of agriculture required greater production of fertilizers, insecticides, tube wells, electric transmission lines and tractors, all of which are manufactured in urban areas. Thus an "urban pull" was generated attracting rural workers, which in turn partly relieved rural employment. When rural development policies were enacted in Pakistan, they were very successful in the Indus Plain, where three-fourths of the country's population lives. A pre-existing canal-based irrigation system was in operation in this area, and the farmers were open to innovation.

Though India felt the effects of Green Revolution at the same time as Pakistan, and had embarked on export production, rural development, industrial expansion, and

some use of tractors in agriculture, a more restricted economic policy from 1947-1985, bureaucratic red tape, corruption, and even the size of the country, restricted urban development in comparison to Pakistan.

India's initial successes related to the Green Revolution were in a limited population area in Punjab, Haryana, western Uttar Pradesh and the northern fringe of Rajasthan, where the irrigation system was well established. The large rural population living in eastern Uttar Pradesh, Bihar, Orissa, Assam, Jarkhand and the Andhra Pradesh coast lagged in adopting innovations. In addition, they continued to have a high population fertility rate, which further disadvantaged these regions. In India, area development covered a limited section of the populace, while in Pakistan it influenced a much wider range of people.

In practice Pakistan's policies were oriented to territorial development with a *bottom-up approach* creating bases for a widely-spread economic development (Siddiqi 1994). India's policies amounted to a *top-down approach,* where development inputs were largely placed in industrial establishments of specific urban centers and capital-intensive, multi-purpose, river valley projects. The repercussions of the two different policies were, (i) continued rural-linked urban development throughout Pakistan, and (ii) development limited to a small northwestern region and a few scattered pockets elsewhere in India.

Low Urbanization Levels of Bhutan and Nepal

Both Bhutan and Nepal are long-standing monarchies with overwhelmingly traditional agricultural economies. They are land-locked and have limited contact with the world beyond their borders. Both their industrial and agricultural development have limited potential. The east-west trending mountains make north-south road development difficult. All factors, make meaningful innovation less likely, leading to minimal levels of urbanization.

In 1950, both countries had a little over 2% of their people living in urban areas. Urbanization in 1996 increased in Nepal to 11%, while for Bhutan it was 6%. During the last five decades (1950-2000), Nepal has been more open than Bhutan to foreign contacts (tourism, mountain climbing, and trade, both through India and China). The Gurkha mercenaries from Nepal recruited by Indian, British and other regiments and Nepalese migrant workers in India continually send money to their rural families in Nepal. After the contract period of generally 15-20 years, the Gurkha mercenaries return home with some capital and innovative ideas derived from living abroad. All these factors have helped Nepal achieve an accelerated pace of urbanization compared to Bhutan. But in both countries, levels of economic development and urbanization remain low, except around the capital regions of Kathmandu in Nepal and Thimbu in Bhutan, and around the road and rail shipment nodes along the southern borders with India.

Urbanization in Bangladesh, Maldives and Sri Lanka

The three countries present different temporal patterns of urbanization. During colonial times (pre-1947) Bangladesh was poorly developed, as the center for the British administrative and industrial activities was Calcutta, lying in present-day West Bengal State of India. During the Pakistan period (1947-71), Bangladesh's urban growth was slow because most Pakistani investment occurred elsewhere, especially in the western wing, which is Pakistan today. Bangladesh lay in the backwaters. The independence of Bangladesh in 1972 was followed by a spurt of economic development, the proliferation of administrative centers, and a population explosion, all generating rural push. All these factors led to rapid urban growth, rising from 4.2% of total population in 1960 to 19% in 1996. Bangladesh in the 1990s has developed a progressive garment manufacturing industry centered on Dhaka and its surrounding area and based on its cheap labor and imported cloth from India. This has become the country's main export, surpassing its traditional export item of jute.

Three phases of urbanization are evident in Sri Lanka after World War II. The first phase (1948-70) illustrates a slow, but steady urban growth emanating from its newly achieved independent status, stable agriculture and slowly expanding manufacturing activity. The second phase (1970-90) saw a reduction of the urban proportion in Sri Lanka from 21.9% in 1970 to 21.1% in 1985, a reflection of economic stagnation and the terrorist activities of Tamil militants in the northern part of the country. In the third phase (1990-2025), the effect of this ameliorated, heralding new economic opportunities which will cause urbanization levels to rise (Dutt and Noble 1996).

The growth of Maldive's urbanization remained modest between 1950 and 1965, but since then the level has started to rise steeply because of its being turned into an ocean-based aquatic recreation center. In 1996, 27% of Maldive's population lived in urban areas.Global warming and subsequent rise in oceanic levels pose threat to the very existence of this low-lying island country in the near future.

IMPACT OF URBANIZATION

Urbanization has changed fundamentally the society, economy, health care systems, physical landscape, cultural patterns, and transportation facilities of South Asia. The impact is most vividly felt in the city proper, but is also experienced with diminishing effect, in the rural areas. Urban development has not only fostered modernization, but has also interjected many social ills.

Cultural Characteristics

South Asia is a vast subcontinent of great cultural diversity. The unique heterogeneity of race, religions, languages, and ethnic backgrounds in the South Asian countries is unmatched by any other world realm. Cities are ethnically diverse, with varying proportions of "alien" populations coming from both within and outside the area. Multi-

ethnicity poses constraints in development programs of the cities, but if handled rationally, as in Singapore, it can be turned into an asset.

Religion. It is generally argued that cities reflect regional religious composition, as most migrants to the city come from surrounding areas. In reality, however, cities are more diverse than the surrounding rural districts, as some migrants also come from distant areas. Furthermore, specific religious groups are attracted to certain cities, thus unbalancing the religious diversity of those places compared to their surroundings.

Several examples from India may be cited. Biharsharief (Bihar) and Ferozabad (Uttar Pradesh) have higher proportions of Muslims than surrounding areas, perhaps because the cities specialize in traditional Muslim occupations; the former in *bidi* making (handmade cigarettes rolled in a leaf) and weaving, and the latter in handmade glass bangles. Lucknow (Uttar Pradesh), Bhopal (Madhya Pradesh), and Aurangabad (Maharashtra) are former capitals of regional Muslim kingdoms. Hence, they have relatively a greater proportion of Muslims compared to their surroundings, where Hindu peasant farmers predominate. Ratlam (Madhya Pradesh) and Aurangabad (Maharashtra) warrant particular attention and further study because the former has the highest ratio of Jains, and the latter of Buddhists, among Indian cities. In and around Aurangabad a large number of Scheduled Caste Hindus (untouchables) converted to Buddhism as a result of reformist B.R. Ambedkar's New-Buddhist movement in the 1950s and 1960s (Dutt and Davgun 1982). Aurangabad is also the focal point of two of the largest ancient Buddhist cave temple complexes. The reasons for the concentration of Jains in Ratlam remains obscure.

Finally, although the city of Bombay (Mumbai) demonstrates a very cosmopolitan nature, it has a high concentration of Parsis, or Zoroastrians, who migrated to the west coast of India fleeing the Islamic conversion of Persia. Eventually, many Parsis became merchants and industrialists and operated from Bombay after the city became the main seat of commerce and industry in the west coast during the colonial period.

Language. Language is yet another aspect of culture that provides variety in city life. Some migrants come from distant places. Thus cities, particularly the larger ones, have greater linguistic diversity than surrounding rural areas. In Bangladesh, Maldives, Nepal and Bhutan, single national languages dominate and the cities reflect this. Diversity in languages is most pronounced in Indian cities, while in Pakistan and Sri Lanka, the situation is complicated by local conditions encouraging fragmentation.

In Karachi in the 1960s, only 16% of its citizens spoke the local regional language -Sindhi. Sixty-six percent were Urdu-speaking refugees, and of the remaining, most were Punjabi-speaking migrants from Punjab. By the 1980s, Karachi received a sizable number of Pushtu-speaking Afghan refugees who have remained in the city. Such diversity has given rise to a multi-lingual Karachi culture. At the same time, bitter rivalries between the *Muhajirs* (emigrants from India) and both native Sindhis or Afghans have arisen.

Although the main language in Colombo, is Sinhala, a sizable number of Tamil speakers may be found. This linguistic division is exacerbated by religious differences. Sinhala speakers are generally Buddhist or Muslim, while Tamil speakers are Hindu.

In India, where there are 18 officially recognized languages (defined as scheduled languages) and long-distance migration occurs in an unrestricted fashion, cities tend to absorb people from many different linguistic areas. The steel manufacturing towns of Jamshedpur (Bihar) and Rourkela (Orissa) have high language diversity because of their employment attraction. With its large service region, Calcutta attracts migrants whose mother tongues are varied, including Hindi (23%), Urdu (11.07%), and Oriya (1.34%), as well as the local mother tongue, Bengali, spoken by a bit over 60% of the city population (Dutt, Khan and Sangwan 1985).

Greater Bombay (Mumbai), the most diverse Indian city, also attracts migrants from a wide hinterland. In addition to Marathi (the language of the state of Maharashtra, in which Bombay is situated), spoken by 42% of the city people, its population speaks Gujarati (18%), Urdu (11%), Hindi (10%) and Tamil (2.6%). No other large city of South Asia shows such a cosmopolitan feature.

As the traditional social supports, such as extended families, presence of caste fellows, and organizations representing the migrants' rural background are no longer fully operative in cities, problems of social stress, personal disorientation and social disorganization increase. The migrants often pursue various deviant behavior such as alcoholism, prostitution, delinquency, and crime. The problems of mugging, drug addiction, drug dealing and more violent crimes have begun to affect the cities.

Crime. Cities located in the north-central region have higher incidences of violent, economic and other crimes than do the South Indian cities. Burglary is mainly a small city crime, but thefts, riots, and kidnappings are concentrated in large cities. Cities registered about three times more crimes per capita than India as a whole. Murder and dacoity (night-time gang banditry) are more rural, but counterfeiting, cheating, criminal breach of trust and theft have a high urban occurrence in India. Rival gangs of different religions, political parties and interfactional groups, sometimes turn the cities into warring factional divisions. The problems are not limited to India. Karachi, in Pakistan, has become a hot bed of Al Qaeda terrorists.

> [Karachi] continued to be plagued by violence in 1998. The Urdu-speaking *Muhajirs* are those who migrated to Pakistan after 1947 and they not only form a majority population of Karachi, but are divided into three warring factions: (1) Muttahida (formerly Muhajir) Qaumi Movement, (2) Muhajir Qaumi Movement (Haiqi group) and (3) Basic Association of Citizens of Karachi. The three factions, mostly opposed to the national government, have their own territorial strongholds in the city; the neighborhoods of Landhi, Malir, Korandi and Sha Faisal Colony and Lines belonging to faction (1) while Nazimabad, Liaqatabad and Azizabad to faction (2). Faction (3) is headquartered in Azizabad. Rivalry among the factions is deep so that when one visits another's area it is nothing but inviting trouble. The Muhajirs are represented in the national and provincial governing bodies as well and hence, have a considerable amount of political clout (Dutt and Geib 1998, 295).

Size of Cities

Not only has the urban population of South Asia grown faster than the rural, but also the pace of growth is projected to accelerate. By 2020, about half of all South

Asians will live in urban areas. In India, the large urban places, particularly cities over 100,000 population are growing fastest. By 1991 over 60% of the South Asian urban population already lived in cities of this size. Small towns, those with 5,000-9,999 inhabitants, often have stagnant or declining populations. In India their share of the urban population declined from 20.14% in 1901 to 2.6% in 1991. Modern economies can be most effective only if the urban centers are larger. When towns grow owing to economic factors and/or natural population growth, they are replaced in the hierarchy by smaller towns less often than in the past.

Concentration of population is very evident in large urban agglomerations. Six UN designated mega cities occur in South Asia- Mumbai (Bombay),Kolkata(Calcutta), Delhi and Chennai (Madras) in India, Karachi in Pakistan and Dhaka in Bangladesh. The two urban agglomerations of Pakistan- Karachi and Lahore- contained 30.80% of the country's urban population in 2000, while in Bangladesh 51% of the urban population lived in the agglomerations of Dhaka and Chittagong. In India 17% of the total urban population, lived in just four mega cities, Mumbai, Calcutta, Delhi and Chennai.

In South Asia urban primacy occurs in Bangladesh, Nepal, and Sri Lanka, where their respective highest ranking cities, Dhaka, Kathmandu, and Colombo, have over twice the population of their second ranking cities. Geographer, Mark Jefferson (1939) pointed out that migrants from different parts of a country contribute to the growth of a primate city, causing the country's forces of unification to accelerate. This is not entirely true of Sri Lanka, where in spite of Colombo's primacy, strong divisive forces in the form of a Tamil separatist movement call for dissolution of the country.

Emergence of Dual Economies

An important factor inherited from colonial times is the presence of a modern manufacturing sector coexisting with a traditional bazaar economy or informal sector, with very little interaction between them. The bazaar sector that includes low paying and less productive jobs such as hawkers, drivers, coolies, hand-cart pullers, rickshaw pullers, manual workers in the modern transportation sector, household workers, and servants contributes much to the employment opportunities for the growing urban population. In Calcutta, the informal sector accounts for nearly 80% of the total employment in commerce. In 1980, 65% of the employment in Dhaka was in the informal sector, mainly in transport, street peddling and day labor.

The modern sector consists of factories using machines and inanimate power and employing large number of workers. These factories initially had products that needed to be processed near the raw material such as sugarcane and rice. Later, industries such as cotton and jute textiles gravitated to market and port locations. Starting from the 1990s, a few South Asian urban areas in India, with Bangalore, Mumbai-Pune, Calcutta and Delhi leading the way, have began to manufacture "high-tech" items, particularly computer software. Like Silicon Valley of California, Bangalore has been popularly designated in India as the Silicon Plateau (Srinivas 1999).

Rapid population growth, along with slow economic development because of an insufficient industrial base, has resulted in a lack of employment opportunities in Asian

cities. Hauser (1957) identified Asia as over-urbanized in population with respect to economic development. This situation developed because of the pace of urbanization, which especially in the decade from 1945 to 1955 far exceeded the growth rate of the economies of Asian countries. Such description remains true of South Asia in the beginning of the millennium. The adoption of capital-intensive products and production methods from the West had a detrimental effect for employment. In order to overcome unemployment in such rapidly growing cities, countries need to explore and expand labor intensive technologies and to develop the informal sector. Such a labor-intensive industrial base may spur initial economic development, but must only be considered transitional, because in order to compete in the world market, the cities must eventually establish capital-intensive, modern industries.

Karachi may be taken as an example of a city where a dual economy prevails. In 1980 two out of every five workers in Karachi were occupied either in production or as transport equipment operators. Apart from two large, industrial estates (Sindh Industrial Trading Estate and Korangi Industrial Area) small-scale manufacturing units, most of which are labor intensive, are scattered throughout the city, often in residential areas.

> Karachi with a 6% share of Pakistan's population, accounted for 70 percent share of Ministry of Production investment in industry in recent years, twice Karachi's share in industry. Although this was largely because of Karachi Steel Mills, which dwarfed the rest of industrial investment, several other major industrial projects (e.g.,in the automobiles, machine tools, fibers, and chemicals) were set up in Karachi by Ministry of Production. As for development expenditure in the Annual Development Plan, Karachi was again the largest recipient, receiving 46 percent of public infrastructure investment (UN, Karachi 1988 p 15).

It is clear that the Pakistan Government is greatly interested in modernization of Karachi-based industries and transport facilities.

THE INTERNAL FORM OF THE SOUTH ASIAN CITY

Geographers and others have long wrestled with the problem of classifying and analyzing urban places (see Chapter 4). They have attempted to apply mostly western economic, functional, morphologic, and mathematical models to cities whose historical evolution, cultural connections and economic and political structures are non-western, for the main part (Noble 1998, 24). With regard to morphology and physical form, the difficulties are manifest. Land use patterns, transportation facilities and residential neighborhood layout, for example, are at variance with western urban experience. Hence, South Asian city patterns are not easily explained or satisfactorily elucidated by modern urban morphology models, such as the Burgess' concentric zone (1925), Hoyt's wedge or sector (1939), or even Harris and Ullman's (1945) multiple nuclei. Nevertheless, numerous attempts have been made, but as geographer Arthur Smailes (1969) noted, "assumptions and theories about city structure tend to be culture bound" and hence not especially applicable outside that culture.

Descriptive Urban Models

Several descriptive models devised to explain South Asian city structure do not seem to have received widespread acceptance, in good part because they lack universality in their application (Noble 1998, 24). For example, Manzoor Alam (1965) evolved a model to account for urban growth and structure in Hyderabad (Figure 16-3). The model is clearly related to those of Western urban morphology, especially to the Burgess' concentric zone model (1925), but it does attempt to formulate, however tentatively, a new approach. In fairness, Marizoor Alam did not intend to offer this model as a universal example for South Asian cities.

Another well known approach is R.L. Singh's (1955) work on Varanasi. Although he did not provide a model illustrating urban growth, he did identify "geographical zones" having a roughly concentric pattern. This approach followed models developed in the United Kingdom. The Banares cantonment part of the settlement, however, did not fit easily into his scheme. Subsequently, Singh gravitated to a multiple nuclei model to explain Varanasi's evolution. In his later work, Singh did attempt a model, drawing an analogy from biology of histogenesis, pattern formation, morphogenesis, fibroblasts and sarcomas. Needless to say, the system never caught on.

Further complicating the analysis of urban structure is the long period over which South Asian cities have evolved. It seems reasonable that even appropriate theories of morphology which apply to the early or medieval periods of South Asian urban history would likely be inappropriate as explanation for modern city form.

Mandala Form Cities

The city in South Asia stretches back to pre-historic time. In some of these urban centers efforts of early planning can still be discerned. They follow a mandala form and are thus related in some fashion to the Hindu (or less often Buddhist) religion (Noble 1998, 24).

The mandala as an influence in early Indian city planning has been extensively studied. In point of fact, the number of examples in South Asia in which mandalas can be attributed as sources of inspiration for town structure is small. Only in the Kathmandu Valley to the north, and in Madurai, at almost the opposite extreme of South Asia, and possibly in Jaipur, have mandala influences been clearly identified.

In the Kathmandu Valley it is the relative positioning of the cities of Kathmandu, Patan and Bhaktapur, as well as their internal form, which is a response to a mandala conception. Jaipur was founded as late as the eighteenth century, but it too utilizes as internal patterns the elements of classical Hindu mandalas. The great temple city of Madurai in south India is the best example of an existing city whose form is clearly the result of the application of mandala planning. On a first visit to Madurai, one is frustrated in attempts to reach the centrally positioned Meenakski Temple by following a straight line toward its clearly visible *gopuram* or gateway tower. Only by following a circuitous route along the encircling ring streets can the entrance to the temple be located.

Bazaar Based Cities

Cities whose form originated in the Medieval period fall into the well known pre≤industrial pattern identified and described by Gideon Sjoberg (1960). Dutt (1983) has termed these settlements *bazaar* based cities (Figure 16-4*).* The basic characteristics are the random and irregular arrangement of streets, crowded streets with little open space and a small central *bazaar* or open space, around which are grouped the most important municipal buildings and the residences of the wealthiest and most influential citizens. The fringes of the settlement shelter inhabitants who have the lowest social ranking and who are often newly arrived from the countryside. Segregation of neighborhoods on the basis of occupation (and occasionally by other social characteristics) is pronounced because place of residence and place of work are in large part coincident. This is primarily a result of the low level of technological development.

Neighborhood enclaves are based on specific castes, religious communities, and linguistic minorities, and are usually outside the core. South Asian cities which follow this model are the products of slow accretional and evolutionary growth over a long time. It is possible that some thought may have been given to the conscious planning of their original and early form, but very little or nothing remains of such initial effort.

In a *bazaar* city "the main vehicular thoroughfares are rarely more than thirty or forty feet in width, often without sidewalks and encroached upon by booths and projecting open fronts of the shops which line them. The side streets and the alleys are usually much narrower and so crooked as to be almost impossible for wheeled vehicles" (Brush 1962, 59).

Some other features include simple or multi-story brick buildings at the center and wattle and daub houses with thatched roofs at the city periphery; the domes, gateways, and pinnacles of religious structures rise all over the city. Houses of the poor are often located near affluent residences due to functional inter-dependence. Commercial activities cluster at the cross-roads of the city center (often termed the *chawk* in North India) and along the main routes of access. Perishable consumer goods are sold every day in the city center and other market places in specifically designated open spaces. Shops are often clustered on the basis of the nature of goods sold and services offered, giving rise to functional specialization of streets and lanes. There is a street inhabited by goldsmiths or silversmiths, and so forth. Money lenders, health practicioners, oculists, dentists and public letter writers congregate in the vicinity of the central *bazaar,* sometimes occupying second story rooms above the shops.

Colonial Administrative Cities

The earliest of the descriptive models of cities developing during the colonial period is that offered by Arthur Smailes. He effectively articulated the binary structure of a large number of Indian cities, pointing out the association of these urban places with administration, both civil and military, and with the network of railways built by the British in the 19th century. Smailes' (1969) description of a city is marvelously effective, drawing forth vivid word pictures of the typical urban place, but his diagram

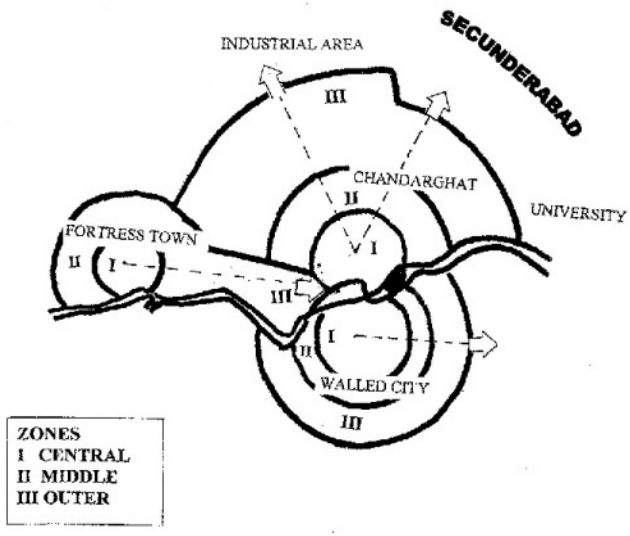


Figure 16-3 Morphological Development of Hyderabad.(Modified from Alam, 1965).

or graphic model conveys little to the reader of the interrelationships of morphological units within the city. Dutt has refined the model that he proposed in 1983 and 1992. He refers to it as the colonial-administrative city(Figure 16-5).

Figure 16-5 depicts the general characteristics of colonial administrative cities of South Asia. They developed during the colonial occupation and possessed all or most of four distinctive features. First, an initial development near the waterfront for trade with Western Europe and for military enforcement made the port facilities a pre-requisite for the largest colonial cites. The second feature emanated from the European need for safety and security. A walled fort with barracks, officers' residences, and church and educational institutions became an invariable component of major colonial cities. The third feature was the creation of a *maidan* or open space, for use as a parade ground and an open area surrounding the fort for a field of fire.

The Evolution of Colonial Administrative Cities

Another characteristic was the division of the city into "native" and European quarters. The "native" quarters of the indigenous people were designed to service the colonial administration and the fort, and characteristically were unsanitary, over-crowded and unplanned.

Such a native settlement in Madras was officially called "Black Town". The European quarters, in contrast, were characterized by garden houses, broad streets, proper drainage and sewage facilities, electricity, and other utilities. In between native and European quarters, a zone of Anglo-Indian residences frequently created a buffer zone. Near the fort and the port, administrative buildings were erected. A description of the original core (George Town) of colonial Madras follows:

> The commercial center of the city is the native quarter called Black Town, which lies immediately behind the harbour and the two or three streets of European banks and mercantile offices which there face the sea, and is more thickly populated than any other part. The principal European quarters are in the west and south of the fringe, ... Here are the fine houses built by the merchant princes and servants of John Company at the end of the eighteenth and the beginning of the nineteenth century, when officials were still allowed to trade. Many, such as Brodie Castle, Doveton House, Gambier's Gardens, still bear the names of the authors of their being. All of these are built of brick used with shell lime/plaster (chuna), and are designed on very generous lines (Imperial Gazetteer of India 1909, 499).

Land Use Djferentiation. As city size increased, some differentiation of land use occurred. Small groupings of *godowns,* workshops, and small factories arose. The godown, or warehouse, derives its Indian name from the Malay "godong." King (1976) has commented upon the significance of the derivation of this word, as well as a parallel evolution of the word *compound* form the Malay "kampon." He notes, "it is some significance that two of the most fundamental functions belonging to urban form of social and economic organization, namely, the division and enclosure of space for residential purposes and the provision made for storing a surplus product are both designated by terms deriving from the economic and political process of colonialism. In small but significant way the terms *compound* and *godown* indicate the impact which colonization has made on urban development in the indigenous society." Eventually a western style, central business district (CBD) also developed in expanding cities.

Over more than two centuries, the British made an important contribution to the form of many South Asian cities. Most noticeably this was in the form of civil administrative sections or military establishments which were grafted onto existing South Asian cities. If the facilitates were to promote civil administration and government, the settlement was termed a *civil station* in larger cities or *civil lines* in smaller centers. Some of the characteristics have been noted above under the discussion of larger administrative centers. If the establishment was primarily military it was termed a *cantonment.*

Cantonment. By 1963, 114 cantonments, created by the British administration, were identified in India (King 1976, 98). In some instances, earlier forts of vanquished foes were occupied and, together with the surrounding territory, turned into a British military post. More often, however, the cantonment was newly planned from the ground up for maximum military advantage.

The cantonment is organized around an open area, the *maidan* which was established as a parade ground. The different branches of military were housed in apartment blocks and barracks, variously identified as *artillery lines* or *infantry lines,* and so on. Indian troops were segregated in their own barracks. Officers' families occupied larger

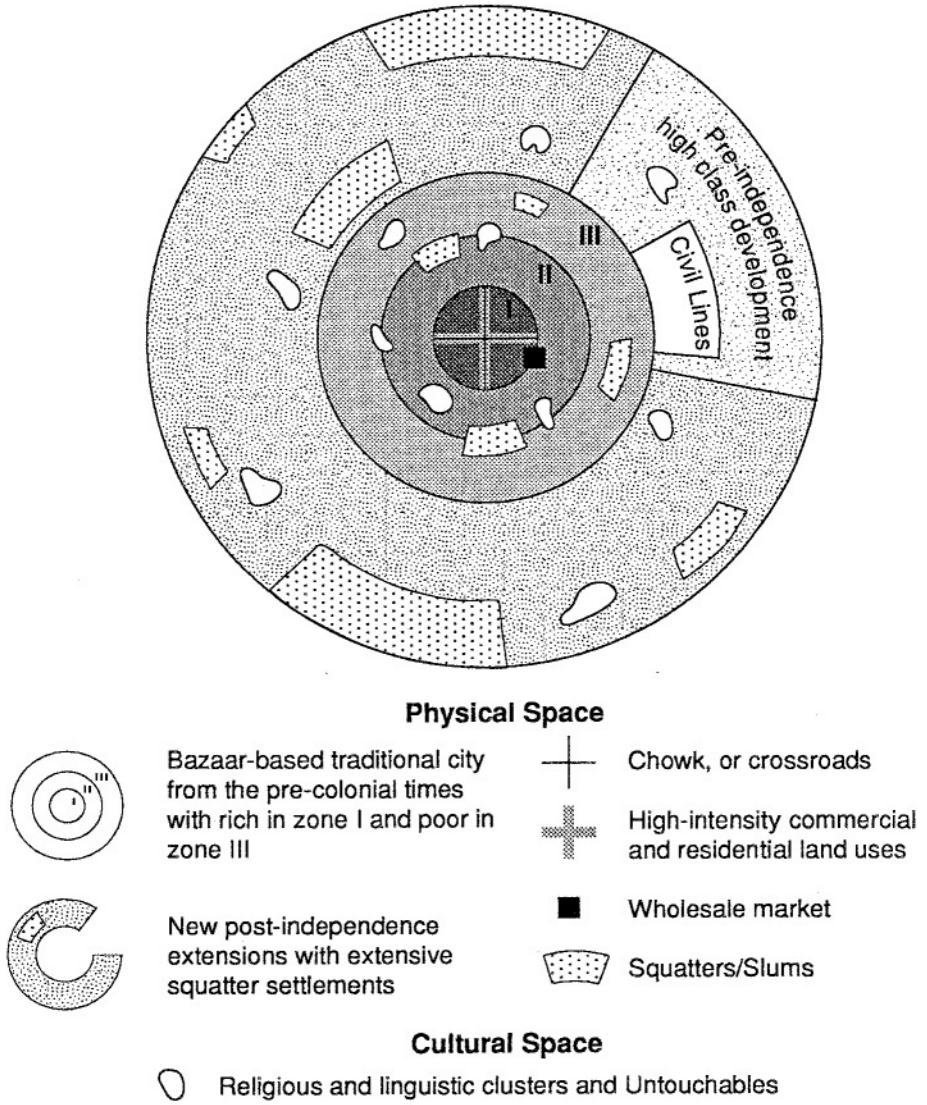


Figure 16-4 India: Model for Bazaar-Based Cities(Source:Dutt et al ,1994).

bungalows in spacious, orderly compounds. After independence, many cantonments were taken over by military forces of the new nations; others simply became upscale urban settlements, desirable because of their relative spaciousness and orderly arrangement.

Colonial Hill Stations. The hill stations are another very specialized settlement. These health resorts or summer capitals for the Empire or its Provinces were summer retreats at higher elevations, used to escape the extreme heat of low-lying plains (see Chapter 5). An attempt was made in hill stations to create a European culture in a cool, home-like (English) environment. Each capital city (province or imperial) developed its own hill station to which government offices and personnel transferred for the hot season. Some of these pairings of capital and hill station are presented below.

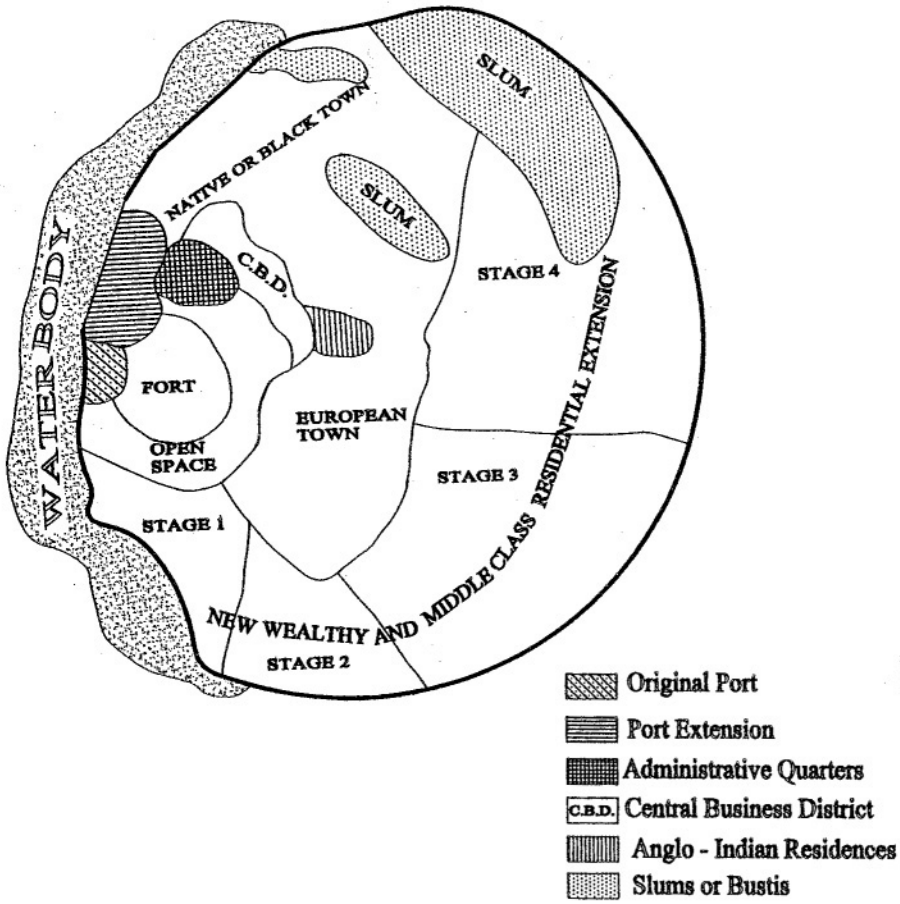


Figure 16-5 India: Model for Colonial-based Cities(Source: Dutt 2001,p 25).

Capital City	Hill Station
Delhi	Simla
Calcutta (Kolkata)	Darjeeling
Bombay (Mumbai)	Mahableshwar
Madras (Chennai)	Ootacamund
Colombo	Nuwara Eliya

Though during the colonial times most visitors to these stations were Europeans and their native entourage, after independence it was affluent South Asians, and their household servants, who replaced the Europeans as visitors.

Planned Cities

Planned cities have existed in South Asia both in the past and at present. Mohenjo Daro (2500 B.C.), Pataliputra (3rd century B.C.), Fatehpur Sikri (16th century), Jaipur (18th century) and Madurai (the present 3-tier walled city, dating back to the 16th Century) are examples of early pre-colonial city planning. The early significance of the *mandala* in some of them is discussed above. Mohenjo Daro in Pakistan, based upon a series of rectangles with the residential sectors separated from public uses, such as workshops, monastery, arena, baths and granary, was the world's first planned city to provide a sewerage system with the connections from the interior of the houses. Though the city eventually was destroyed and buried under the sediments brought by the Indus river, the elements of its planning persist in designs of settlements in western India and Pakistan.

Pataliputra, capital of the first systematically organized kingdom in South Asia, was a walled city with an oblong shape. The king's palace at the center, surrounded by residences of important people, formed the core of the city. Hindus of four different castes inhabited quarters in four different directions from the core. Like Mohenjo Daro, Pataliputra was ultimately engulfed by the floods of another major river, the Ganga (Ganges) and its tributary the Son. Only disjointed traces of Pataliputra have been recovered from the centuries old sediment deposits, whereas a good part of the Mohenjo Daro ruins that lie in a dry desert area have been reclaimed.

Jaipur, in Rajasthan State, India, built by Maharaja Jai Singh, a vassal of the Mughal Emperor, was designed with huge rectangular city blocks, elements of which are still found in the city center. Built as a ceremonial center, the city has main roadways over a hundred feet wide and lined with impressive monumental buildings.

Colonial Period Planned Cities. New Delhi is the best example of a planned city from the colonial era. Started in 1911, it combined several geometrical designs in a Baroque style similar to the plans of Washington and Canberra. Its focal points are the Viceroy's House (now the President's House), the Council House (now the Parliament), and the circular retail center of Connaught Place (which has developed into a modern CBD), with an extensive green space in the very middle. The density of population was kept minimal; houses had large surrounding gardens; roads were broad; statues of King George V and other dignitaries from England created an atmosphere of eternal imperial

presence. Colonial New Delhi situated adjacent to historic Old Delhi, is today surrounded by very large planned and semi-planned extensions.

On a different level, Jamshedpur was established by the Indian industrialist family, the Tatas, between 1907 and 1911 as a planned company town, whereas Durgapur, Rourkela and Bhilai, also major steel centers, are planned industrial cities of the post-independence period by the efforts of the Indian government. Jamshedpur benefited from four separate planning efforts. The Kennedy plan (prepared by a U.S. consultant group) in 1911 proposed an American based grid-iron, rectangular plan surrounding the main gate of the steel mill. The Temple Plan of 1920 was a functional plan that followed the contours of the area, whereas the Strokes Plan of 1936 suggested that the city be divided into concentric circles with the steel mill at the center, workman's quarters located within a one mile radius, and the more distant rings allocated to dwellings for officers and other employees in the higher income bracket. Finally, the Koenigsberger Plan of 1943 introduced the innovative neighborhood unit concept, and also discouraged building of residences on the leeward side of the steel mills. As Jamshedpur expanded, during the post-colonial period, larger areas were incorporated within the city limits, and the city now includes an expanded urban area. However, elements of all four planning efforts can be seen in the existing city form (Dutt 1993).

Post-Colonial Planned Cities. The masterpieces of post-colonial city planning in South Asia are Pakistan's capital of Islamabad, planned by the famous Greek planning firm of Doxiadis and Associates, and Chandigarh, a joint capital of the two Indian states of Punjab and Haryana, planned by the French architect and planner, Le Corbusier. Both are growing cities that have been planned comprehensively, with land uses earmarked for distinct functions and with separated, self-contained neighborhoods. Chandigarh has reached its projected population limit of half a million. It is now expanding into Punjab state, whereas the adjacent Haryana state has already constructed a satellite city, Panchacula, just outside the slim and fragile green belt of Chandigarh.

The main characteristics of the colonial and post-colonial planned cities are functionally differentiated land uses, systematic traffic design and provision of open spaces and garden-like environments, along with facilities such as shopping, schools, hospitals, sewage and waste treatment, piped water supply and other modern amenities. Metropolitan planning encompassing the city-region, is in practice in all the mega-cities of South Asia. Delhi was the first city to introduce metro planning in the 1950s, followed by Calcutta in 1966, and then Chennai and Mumbai in the 1970s.

A Composite Model

A few geographers have attempted to provide models to explain modern urban growth and development in India. Perhaps the most ambitious model was proposed by Johnson (1979), although it tended to include too much detail and hence failed to function properly as a model. Spatial relationships were especially difficult to identify. The model also became too complex, by attempting to explain the entire history of urbanization in India (Noble 1998, 25).

Alok Singh (1988) is one of the very few Indian geographers to examine the land use patterns of small cities and to attempt model building therefrom. His models refer to modern, industrial, planned communities and thus apply only to a very restricted group of cities (Figure 16-6). They do not have much applicability to most Indian cities. Singh's models have marked concentric arrangement, which is partly the result of the planning framework of these cities and partly probably the influence of the classic Burgess model used for American cities. Western urban structure models are not applicable in developing countries because of different histories of migration, nature of culture, levels of affluence and lack of massive numbers of mechanized means of transport, particularly automobiles.

Housing and Slums

The rapid growth of South Asian cities has created practically all facets of human life, most tragically in housing. New middle and upper class housing developments take place around the existing built up area. Such developments are encouraged by government policy.

Most urban dwellers, however, live in accommodations viewed from a western perspective as sub-standard, lacking in the most rudimentary facilities. Provision of proper housing, particularly for low income groups, is a constant problem for growing South Asian cities. In 1958 about 120,000 persons lived in the 22 slum clusters in and around Karachi; by 1986 2.6 million persons (about 40% of'Karachi's population) lived in 432 squatter settlements. In Mumbai over 70% of all residents live in one-room households, one-third live in houses made of grass, leaves, reeds, and sheet metal walls. It is estimated that over a third of Delhi and Calcutta populations live in slums. A 1998 survey conducted by the Calcutta Metropolitan Development Authority revealed that 64% of slum dwellers live in a household space of less than 100 sq. ft. The same survey pointed out that 92% of slum households share toilet facilities with other households.

Squatter and spontaneous settlements are of three distinct types: (1) the homeless or pavement dweller areas, (2) the slum and tenement areas, particular in the largest cities, and (3) the squatter housing and shantytowns. Squatter housing, the most common type, is usually constructed on land not officially designated for building purposes. Typical sites are marginal lands and small vacant lots, land adjacent to railway lines, or on flood plains, and sometimes swampy, unused land, or land subject to monsoon flooding. Once land is occupied it is difficult, often almost impossible, to displace the settlers. Though squatters do not have legal claim, it is embarrassing and politically unpopular to evict families from such land.

Squatter settlements reflect the failure of the private and public housing sectors to provide low-income housing. Where even marginal quality rental property is available, either in private tenements or in government housing schemes, rents are generally beyond the reach of the poor. Public services cannot keep up with the rapid rates of population growth. Thus, large South Asian cities are characterized by an economic and social dualism. Some areas are supplied with all the services and have decent environments, and at the same time, others have living conditions worse than rural areas. Pala-

tial residences and modern luxury apartments stand in contrast to one-room, temporary huts, and the structures for wealthy and poor are often not far from each other.

To solve the housing problem of the poor, brick and mortar apartments with modern plumbing and potable water supplies are built by public agencies mainly for civil servants. In India, for example, urban populations have grown one-and-a half times faster than total population. The flight of people to the city is not difficult to understand. Agricultural land is fully occupied, and few other rural resources exist to support ever-expanding numbers. To many, it is only in cities that economic opportunity offers itself. Thus, there is more "rural push" in operation than "urban pull."

IMAGE OF A CITY

For those born and brought up in the city, and who have reconciled themselves to urban life, the city is often a place of security viewed with fondness. Yet the image of the city is not always positive. The problems of poverty and hunger are often exacerbated in the city, especially for the newly arrived. The villager may be overwhelmed with the scale of the city, its noise, traffic and general hubbub. The press of people is frightening to one used to the small, quieter village. The stinginess of the city is the theme quite often emphasized by writers of fiction.

Geographers and other scholars have long recognized that fiction writers often are able to capture the "sense of place" or the image of the city in ways which enable social scientists to expand and reform their interpretations of urban places. Often this is done through exaggeration of particular characteristics, or alternatively through the use of metaphors, rather than by literal descriptions.

Because of India's much larger population, the best known South Asian novels involving urban life are those by Indian writers. For this reason, most interpretive studies of Indian urban patterns by geographers and other social scientists also have focused upon Indian writers and Indian urbanization. Nevertheless, the conditions and reactions noted by other writers are quite similar throughout South Asia.

Urban places in some instances are recognized as places of salvation offering bright opportunities for the people, especially as a result of the application of technological innovation. More often, the menacing negative aspects of urbanization are emphasized. The city is portrayed as a location which threatens the collapse of traditional values and offers little replacement. The urban migrant faces a never-ending struggle to maintain himself as survival odds become longer and longer.

Negative reactions to urban life and conditions are long standing and not uniquely South Asian. Virtually every American student is aware of the dismal portrayal of industrializing European cities provided so vividly in the novels of Charles Dickens, among others. Very much earlier, the Mughal emperor Babar, who ruled South Asia from 1526 to 1530, had seen similarly distressing conditions in Delhi and also reacted negatively.

The process of development (especially that of industrialization) we feel should be a neat and tidy one, and today the sensitive writer, particularly the expatriate, fre-

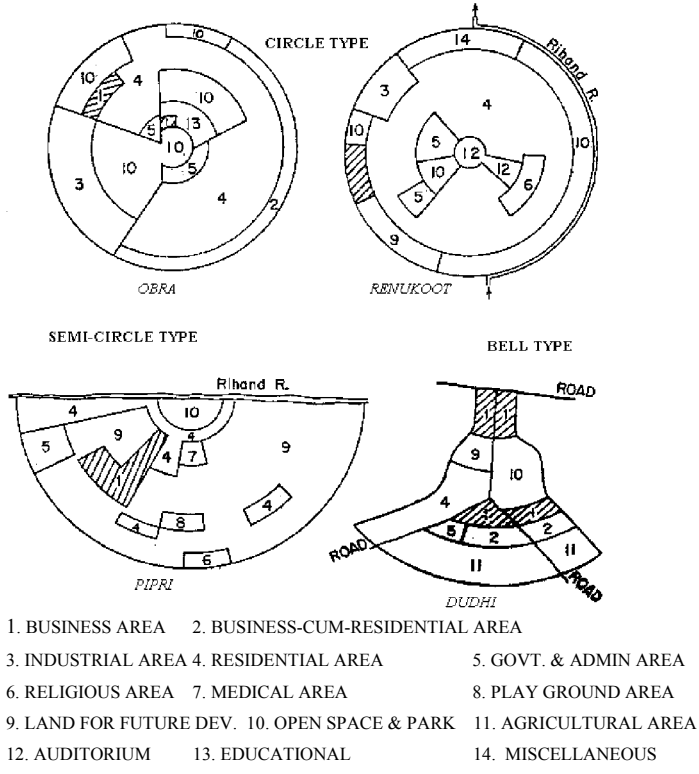


Figure 16-6 Alok Singh's Urban Models (1998).

quently rebels at the disorder and chaos of the city. The negative reaction of many Indians to urbanization also has another source. The great revolutionary leader, Mohandas Gandhi, epitomized the resistance of many Indian intellectuals to urban life. For Gandhi the city was an unnatural place where honest citizens were likely to be exploited. As the centers of capitalism (most often foreign), cities were "a constant menace to the life and liberty of the villager," draining away resources and leaving only the impoverished behind. Clearly, the process of urbanization impacted not only the village, but the very urban place itself.

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